SEPTEMBER 10, 1923

THE RUBBER AGE

VOL. XIII. NO. 11

Copyright, 1923, by The Gardner, Moffat Co. Inc.

TABLE OF CONTENTS

NEWS SECTION

General Business Shows Improvement 421
Fitch Heads Republic Rubber 421
Exhibits at Chemical Exposition 422
Position of British Rubber Manufacturers Improving 422
July Exports Show Decline 423
Rubber Investigators Sail for Philippines 423
Manville-Jenckes Merger Ratified 424

FEATURE SECTION

Fighting Boll Weevil By Airplane 426
Resistance of Rubber to Tearing 429
Accelerated Aging of Vulcanized Rubber 433
Foreign Rubber Markets 435

MARKET SECTION

Cottons and Fabrics 438
Chemicals and Compounding Ingredients 439
Crude, Scrap and Reclaimed Rubber 440
Patents, New Incorporations and Trade Marks ... 441

PUBLISHED ON THE 10th AND 25th OF EACH MONTH BY

THE GARDNER, MOFFAT COMPANY, Inc.

ADDRESS ALL CORRESPONDENCE TO BUSINESS AND EDITORIAL ROOMS: 225 FOURTH AVENUE, NEW YORK

Telephone: Stuyvesant 4552

PUBLICATION OFFICE: HIGHLAND, N. Y.

Published Semi-Monthly by the Gardner, Moffat, Co., Inc., Highland, N. Y., and 225 Fourth Ave., N. Y. City.
Entered as Second Class Matter June 10, 1920, at the Post Office at Highland, N. Y., under the Act of March 3, 1879.
Advertising Forms Close Ten Days Before Date of Publication. Rates for Advertising Will Be Furnished on Application.
Subscription Price: $2.00 per Annum. Single Copies 10 Cents. Canada, $2.50 per Annum. Foreign, $3.00 per Annum.

F. R. HENDERSON & CO., Inc.

CRUDE RUBBER

111 BROADWAY, NEW YORK

CABLE ADDRESS
"REDSONDER, NEW YORK"

LIEBER'S
A. B. C. 5th EDITION and
PRIVATE CODES

LONDON
HENDERSON, FORBES & CO., Ltd.

SINGAPORE
HENDERSON BROS., LIMITED

BATAVIA
HENDERSON BROS., LIMITED

CHALK-WHITING

Genuine Pure *Soft* decomposed chalk. Not to be confounded with hard domestic limestone or By-Product Whitings. Ask your chemist—He knows.

Very Fluffy — Light Gravity
EXTREMELY SOFT

If you are not using K-T Chalk start now.

The Only American Chalk Whiting

Write or Wire for Samples and Price

Manufactured by the

KRIPPENDORF - TUTTLE WHITE CLIFFS PRODUCTS COMPANY

General Sales Office
30 NORTH MICHIGAN BOULEVARD, CHICAGO

WAREHOUSE STOCKS AT BOSTON — NEW YORK — CHICAGO

THE RUBBER AGE

The Only Twice-a-Month Rubber Publication

VOL. XIII. SEPTEMBER 10, 1923 No. 11

GENERAL BUSINESS SHOWS IMPROVEMENT

Akron Reports That Employment Conditions Are "Easing Up"—More Jobs Available—Return of Railroads Into Buying Field Will Help Rubber Industry

In the aggregate general business conditions have a direct bearing upon the employment workers and the sales of rubber goods. From an international point of view business conditions are still erratic in Europe, it being said that Europeans are desirous of obtaining America's aid in solving their industrial problems.

Reflection of business and industrial conditions from a National standpoint, however, would indicate improvement, and at present there prevails an expressed optimistic attitude, especially among rubber manufacturers, regarding the future. Particularly in Akron is improvement in business predicted. The employment bureau there states that while the number of applicants for jobs has not decreased, still there are more jobs available and a larger number of applicants are being placed. It is also stated that there are encouraging signs regarding winter employment. Usually the rubber plants increase production for the spring demand, and this naturally means that more men will be employed.

Another encouraging feature is that many large industrial concerns are reporting favorably, and at present the railroads have planned to spend over a billion dollars for new equipment in order to handle heavy freight traffic. This undoubtedly is the brightest star in the business horizon, for it indicates the trend of trade.

The possibility of a coal strike looms up as a barrier to business and trade expansion. Should the coal miners go on strike the rubber factories throughout the country will be struck a severe blow, even though many of the companies have purchased advanced reserves of coal.

But the fact that nearly all rubber companies are reporting increased sales, and the fact that regular dividends are again being paid should serve as a barometer, indicating in a way the rubber trade trend for the next six months.

STAR AND MOHAWK MERGER?

It is reported from Akron that the Star Rubber Co., and The Mohawk Rubber Co., have consolidated so as to effect economies in distribution and production. It is said that control will be vested in the Mohawk company. Confirmation of the report has not yet been made but is expected shortly. The total output of the companies is estimated at about $5,000,000 annually.

SINGAPORE RUBBER EXPORTS TO U. S. SHOW DECREASE

According to *The Straits Echo* of July 7, the exports of rubber for June from Singapore in centals of 100 pounds were as follows: United Kingdom, 88,284 centals; United States, 252,914; the Continent of Europe, 31,925; British possessions, 8,773; Japan and other foreign countries 34,828 and 400 centals respectively. Total value of rubber exported for the first six months of 1923 is placed at $140,976,000.

The May returns showed a considerable fall. A striking feature is a further decrease in exports to the United States. Against this we have still higher figures for the United Kingdom and the continent of Europe.

America took 427,326 centals in April, 317,869 in May and only 252,914 in June. The totals for the United Kingdom in this order have been 61,311, 76,479 and 88,284 and for the Continent 19,213, 27,321, and 31,925, centals respectively. The Japanese took much more rubber in June, 34,828 centals compared with only 18,576 in May and 25,006 in April. The total exports show a reduction of over 30,000 centals, being 417,000 compared with 450,592.

"As a rule," continues the statement, "people follow the figures for the United States without noticing the movements elsewhere. America imported freely for the first four months and it was supposed that her increased production in commodities would exist over another three . . . . We shall have to wait until about the end of the year for another spurt."

E. H. FITCH HEADS REPUBLIC RUBBER

Succeeds C. H. Booth, formerly Receiver, as President of Company—Has Had Broad Experience as Rubber Executive—No Other Changes Planned

With the culmination of his duties as receiver for the Republic Rubber Company, Mr. C. H. Booth has decided to relinquish his present position as president of the Republic Rubber Company of Youngstown, Ohio.

It was the earnest wish of the financial interest of the new company that Mr. Booth continue his active association with the Republic Rubber Company until all the details of reorganization had been definitely decided and until the new organization was satisfactorily launched. That time has come and Mr. E. H. Fitch, former vice president, and the man whom Mr. Booth chose for his right hand man during the receivership, has been made president of the Republic Rubber Company, to carry on the constructive policies established by Mr. Booth.

This announcement follows a directors meeting recently held at Youngstown, Ohio.

Mr. Fitch has had a wide experience in the business world. Graduating from Cornell University, he was for seven years district manager of the Standard Oil Co., with headquarters at Akron. He afterwards became district manager of the Philadelphia division of the Diamond Rubber Co. which position he held for 14 years. When the Philadelphia offices of this concern were consolidated with those of the Goodrich Rubber Co., he was placed in charge. Near the close of 1921 he accepted the position of general manager of the Republic Rubber Co. in Youngstown. His sales policies have been built to help dealers solve their problems.

Mr. Fitch announced that there would be no further change in the organization under his supervision. "It is the wish of the board of directors that the Republic Rubber Co. remain an independent integrated concern and that it retain its character as a community organization," he said.

The Republic Rubber Co. was recent-

(Continued on Page 422)

WILL HAVE EXHIBITS AT CHEMICAL EXPOSITION

The Luzerne Rubber Co. and the American Hard Rubber Co. will exhibit rubber radio parts at the National Exposition of Chemical Indusries which opens at the Grand Central Palace, New York City, on Sept. 17. Other companies will exhibit radio parts, used in the construction or operation of the radio, some of the metals used being thorium, tellurium, selenium, tantalum and molybdenum.

The following companies will have exhibits at the exposition of interest to the rubber trade:

Abbe Engineering Co. ..... 50 Church Street, N. Y. City
American Hard Rubber Co. ..... 11 Mercers Street N. Y. City.
American Schaeffer & Budenberg Corp. ..... So. Fifth St., Brooklyn.
Anaconda Copper Mining Co. ..... Perth Amboy, N. J.
Bakelite Corp., 8 West 40th Street, N. Y. City.
Benzine Condensation Co. ..... 220 W. 42nd Street, N. Y. City.
The Bristol Co. .....Waterbury, Conn.
Brown Instrument Co. .....Philadelphia, Pa.
Cooper Hewitt Electric Co. ..... 95 River St., Hoboken, N. J.
Carrier Engineering Corp. ..... Frelinghuysen Ave., Newark, N. J.
J. P. Devine Co. .....Buffalo, N. Y.
The Dow Co. .....Louisville, Ky.
Elmer and Amend, 205 Third Avenue, N. Y. City.
General Electric Co. .....Schenectady, N. Y.
The B. F. Goodrich Co. .....Akron, Ohio
Industrial Chemical Co. ..... 200 Fifth Avenue, N Y. City
Johns-Manville, Inc. ..... 296 Madison Avenue, N. Y. City
Luzerne Rubber Co, ...Trenton N. J.
Morse Chain Co., 30 Church Street, N. Y. City
Magnesia Talc Co. .....Waterbury, Vt.
Mohegan Tube Co. .....Scott Street, Brooklyn
National Rosin Oil & Size Co. ..... 90 West Street, N. Y. City
New Jersey Zinc Co. ..... 160 Front Street, N. Y. City
New York Thermometer Co. ..... 36 E. 23rd Street, N. Y. City
Pfaudler Co. .....Rochester, N. Y.
B. F. Sturtevant Co., Inc. ..... Hyde Park, Boston, Mass.
Sturtevant Mill Co., Harrison Sq., Boston, Mass.
C. J. Tagliabue Mfg. Co. ..... 18 Thirty Third St., Brooklyn
Uehling Instrument Co., ...Paterson, N. J.
U. S. Industrial Alcohol Co. ..... 110 E. 42nd Street, N. Y. City
U. S. Industrial Chemical Co. ..... 110 E. 42nd Street, N. Y. City
Union Sulphur Co., 33 Rector Street, N. Y. City
United Metals Selling Co. ..... 25 Broadway, N. Y. City
Westinghouse Elc. & Mfg. Co., E. Pittsburgh, Pa.
Whiting Corp. .....Harvey, Ill.

Rubber Association News

The Original Tire Equipment Committee of the Rubber Association, composed of the executives of the tire manufacturers supplying original equipment to automobile manufacturers, met in New York on Aug. 7, and discussed general conditions obtaining in that trade.

* * *

On Aug. 8 the Executive Committee of the Tire Manufacturers' Division held a special meeting with a Committee representing the Tire and Rim Association of America, Inc. The standardization of cross sectional widths of the so-called "balloon" pneumatic tire was the subject considered, but it was passed for discussion at the September regular meeting of the Tire Executive Committee, when, it is expected, final action will be taken thereon.

* * *

The Service Managers Committee of the Tire Manufacturers' Division met in Cleveland on Aug. 13 and 14, and progressed its work on the preparation of an educational pamphlet on the care of truck tires, the contents of which will be devoted to matter similar to that contained in the Association's booklet entitled "The Care of Pneumatic Tires," which has received such widespread approval throughout the trade. Adjustment conditions in general, and ways and means by which they might be improved, also received attention.

* * *

An order for an additional million copies of "The Care of Pneumatic Tires" has been given to the Association's printer. Two million copies have already been distributed throughout the country.

Fire Damages Reclaiming Plant

The Central Rubber Reclaiming Company's plant at Defiance, Ohio, was damaged by fire recently, the loss being estimated at $125,000. Low water pressure is said to be responsible for the firemen's inability to check the flames before considerable damage was done. The loss is practically all covered by insurance, it is said.

Explosion of a devulcanizer is believed to have caused a break in an electric line that resulted in the fire.

The fire will cause only a short halt in production, which will be continued in the three-story structure that was saved, until the new building can be completed.

Connecticut Goodyear Increases Capitalization

The Goodyear Rubber Co., Middletown, Conn., has filed a certificate of capital increase with the secretary of state. The increase is from $50,000 to $300,000, to be taken care of by the issuance of 2,500 shares of unissued authorized capital stock at a par value of $100 a share. These shares will be paid for out of the undivided profits, or surplus of the company.

New Addition For Lima Sole

Through the addition of a new mill to the plant of the Lima Cord Sole and Heel Co., Lima, Ohio, the plant's capacity will be practically doubled. New machine has been purchased, and the new mill will be ready for operation by October. For the past six months the company's mills have been operating day and night.

Companies Pay Dividends

The B. F. Goodrich and the Lee Tire & Rubber Companies have declared regular quarterly dividends on their preferred and capital stocks respectively. The regular quarterly dividend on the preferred stock of 1¾ per cent is payable by the Goodrich company on Oct. 1, 1923, to stockholders of record, Sept. 21, 1923. Directors of the Lee Rubber and Tire Co. declared the regular quarterly dividend of 50 cents a share on the capital stock, payable Sept. 1, to stockholders of record, Aug. 15, 1923.

POSITION OF BRITISH MANUFACTURERS IMPROVING

The reduction of London stocks of crude rubber from 73,361 tons on Jan. 27 to 50,335 tons on July 7, and in Liverpool stocks from 8,782 tons in Dec. 1922 to 5,559 tons in June 1923 is accounted for by the excess of exports over imports amounting to 8,846 tons in the first six months of 1923, and by the takings of British manufacturers, which amounted to 17,403 tons for six months or at a rate of about 35,000 tons per year, which is a very substantial improvement over their purchases for the two previous years (1920—25,000 tons; 1921—24,000 tons). It is not possible to estimate what percentage of this year's purchases are for future use, but the rising market undoubtedly caused considerable speculation.

The position of the British manufacturing industry has improved during the past six months particularly in the sale of hose and mechanical rubber goods. German makers of small rubber goods have been active in this market as heretofore and have caused some anxiety to British makers. There has been some improvement in the position of tire manufacturers, although competition from foreign manufacturers continues to be severe. According to the Board of Trade, 10.7 per cent of the workpeople in the industry were unemployed at the end of May as compared with 13.1 per cent on Dec. 18, 1922, indicating an improvement although the position seems still unsatisfactory for the industry as a whole. (Trade Commissioner, Hugh D. Butler, London.)

Mellon Institute Lectures

Among the lectures to be given in the Fellows' Room of Mellon Institute during 1923-1924 will be a lecture by H. W. Greider on "Rubber Compounding Agents" on Monday, March 24, 1924.

Dugan and Mason Open

Announcement is made of the formation of the concern of Dugan and Mason with offices at 109 North Union Street, Akron, to handle crude rubber, fabrics, machinery and supplies for the rubber and allied trades. Both F. F. Dugan and C. L. Mason are well-known in the rubber industry, their most recent connection having been with the Denman-Myers Cord Tire Co., Warren, Ohio.

Fitch Heads Republic Rubber

(Continued from Page 421)

ly sold to the Lee Rubber & Tire Co. of Philadelphia and New York. Officers are: Chairman of the Board of Directors, John J. Watson Jr., of New York City; President, E. H. Fitch; Vice President, A. A. Garthwaite; General Counsel, John T. Harrington, Youngstown; Secretary, C. F. Garrison; Treasurer, H. J. Stambaugh, Youngstown; Comptroller, W. B. Ohl; Assistant Secretary and Treasurer, William B. Dunlap.

RUBBER INVESTIGATORS SAIL FOR PHILIPPINES

The personnel of the field expedition that is to investigate rubber possibilities in the Philippines, in behalf of the Department of Commerce is as follows:

Mr. C. F. Vance, of Troy, Ohio, Special Agent, in charge of expedition. Mr. Vance has had 15 years experience in the Philippines and is thoroughly conversant with the small rubber plantation situation of the Islands.

Mr. Vance will be assisted by Mr. Alex H. Muzzall of Carpinteria, California, a practical rubber plantation man who was for many years connected with the Goodyear plantations in Sumatra; by Mr. John P. Bushnell, of Washington, D. C., Assistant Trade Commissioner of the Depratment of Commerce who has been connected with rubber investigation activities of Department since its inception, and by Mr. Mark Baldwin of the Bureau of Soils, Department of Agriculture.

The party is expected to sail from Seattle, Washington on September 11th.

Federal Aid To Brazilian Rubber Factory

By Federal decree of Nov. 14, 1922, the Brazilian Minister of Agriculture, Commerce and Industry was authorized to negotiate a contract with the Companhia Brazileira de Artefactos de Borracha, of Rio de Janeiro, to assist in the enlargement of its plant. The federal aid to be extended to the plant is to take the form of a guarantee of a 6% dividend for three years, a premium of 500 contos (about $55,000 at current exchange) when the enlarged plant is completed, and an additional premium equal to 5% of the total effective capital invested after the new plant has functioned one year. For a period of 25 years, the company is to enjoy exemption from federal and municipal taxation, as well as from import duties on all supplies and equipment not obtainable in Brazil. (Consul General A. Gaulin, Rio de Janeiro.)

Sullivan New R. A. Accountant

F. J. Sullivan was recently appointed by The Rubber Association of America to assist the Accounting Committee in the formulation of uniform accounting fundamentals for rubber manufacturers. His work has met with the whole hearted support of the Association members and is progressing very satisfactorily. Mr. Sullivan was up to recently with the Braender Tire & Rubber Co., and was formerly connected with Goodyear and Dunlop.

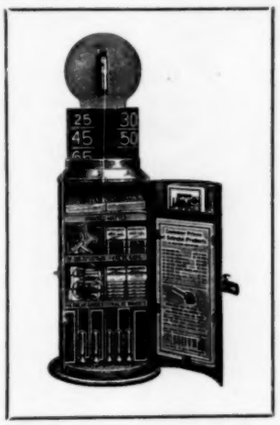
Wood Tours Mindoro Isle

A party of rubber men including General Leonard Wood and W. H. Gardiner, a magazine writer, are now touring the island of Mindoro, the object of the trip being to determine the rubber and sugar possibilities on the island. Other members of the party are M. A. Cheek, manager of the Firestone Co. and Bradford Hardon, an American sugar man.

New Schrader Container

Effective merchandise containers called the Schrader "Silent Salesman" designed for dealers carrying Schrader tire valve accessories, have recently been distributed.

This display container, twenty inches in height, is a giant replica of the well-known Schrader Tire Pressure Gauge. It stands out prominently in the dealer's store, incites curiosity and at the same time delivers an effective sales message—"Own a Schrader Gauge and use it"—to every customer who sees it.



Schrader Counter Display

At the rear of the container is a door which can be locked. Inside are eight compartments containing a small stock of Schrader Tire Valve accessories. Each article can be quickly and conveniently stocked and removed. Thus, the dealer can keep a supply of Schrader merchandise safely in a compact, convenient cabinet which facilitates service and saves his own time.

This merchandise, which is known as the No. 4657 Schrader "Silent Salesman", contains Schrader Tire Pressure Gauges, Valve Insides, Valve Caps, Dust Caps with Rim Nut Bushings, Valve Repair Tools, Pump Connections and a Star Wrench. These goods are shipped packed in the "Silent Salesman" cabinet, the container being included without charge. A supply of Schrader literature is also included to assist the dealer in selling these products.

Roach To Address Rubber Men

The program of the National Safety Council, which will hold its twelfth annual congress in Buffalo, Oct. 1 to 5, has been announced. On Oct. 2 there will a joint meeting of the Chemical and Rubber sections. Among the speakers will be John Roach, Deputy Commissioner of Labor of the State of New Jersey. His theme will be the Elimination of Occupational Diseases in the Chemical and Rubber Industries. A. G. Smith, chemical engineer, The Travelers Insurance Co., will discourse on Safe Handling of Solvents, while a special committee will report on the subject of Benzol Poisoning.

JULY RUBBER GOODS EXPORTS DECLINE

Sharp Seasonal Decrease in Tire Shipments Mainly Responsible for Lessened Value of Total Outgoing Cargoes—Footwear, Hose and Belting Showed Increase

Exports of automobile casings during July experienced a sharp seasonal decline, only 98,290 being shipped, as compared with 144,556 in June. The result was reflected in the total value of rubber goods exports in July which dropped to $2,894,397, as compared with $3,556,345 in June and $2,822,656 in July, 1922.

The decline in tire exports though somewhat abrupt appears to be in accordance with the general trend of export markets last year, says the Rubber Division of the Department of Commerce. At this season of the year Australia, New Zealand, British South Africa, Argentina, and Uruguay are normally dull markets, and active buying there will only be resumed in the three closing months of the year. In England the price reduction made effective by Michelin, July 1, has stirred the British manufacturers to energetic propaganda, and as the price decline is not much favored by the rank and file of the tire dealers it is likely to react in favor of increased sales of British makes. England took only 18,945 casings in July, as compared with 45,055 in June. The tire season is also now on the wane in Norway, Sweden, and Denmark, and the Italian market is reported to be dull in addition to being a highly difficult one for American firms at present exchange rates.

Exports of rubber boots and shoes, hose and rubber belting were on the increase during July. Canvas rubber-soled shoes and other rubber shoes showed no price variations of consequence. The unit values of mechanical rubber goods exports remained practically the same as during the previous quarter.

The increasing exports of rubber shoes are due to European purchases during July, Switzerland, Turkey, Norway, Denmark, Austria, and Italy all coming into the market. From now until the end of the year close attention should be given to the European trade in rubber shoes.

(For Statistics see Page 437)

Alling Rubber To Build

The Alling Rubber Company, New London, Conn., will erect a three-story commercial building in State Street, the approximate cost of which will be about $800,000. The company operates a chain of rubber stores in New London and adjacent territory.

Para-Belle Opens New Store

The Para-Belle Rubber Co. with factories in Mansfield and Columbiana, O., has opened a new branch store in Conneaut, O. This is the seventh retail store that the concern is operating.

MANVILLE-JENCKES MERGER HAS BEEN RATIFIED

Final steps in the merger of the Jenckes Spinning Company and the Manville Company were taken on Aug. 23, when at special meetings of the stockholders of both corporations the plans of the Directors were ratified.

Following these meetings incorporation papers were prepared for filing with the Secretary of State, amending the charters of the two corporations and merging them into one corporation to be known as the Manville-Jenckes Company, with a capitalization of $39,000,000.

As soon as the papers are filed the new corporation will proceed to organize by the election of officers. It is understood that Henry F. Lippitt, former United States Senator, who has been general manager of the Manville Company, will be chosen President of the new corporation, with Frederick L. Jenckes, Treasurer of the Jenckes Spinning Company, as Treasurer. Isaac B. Merriman, who was President and general manager of the Jenckes company, as well as Vice President of the Manville Company, will probably be general manager, and Charles H. Merriman Jr., a Director of the Manville Company, will become Vice President.

This merger will unite two of the largest cotton manufacturing companies in Rhode Island, operating nine plants in that State and one in North Carolina and employing more than 5,500 persons.

Seiberling Buys Additional Plant

It is reported that F. A. Seiberling, president of the Seiberling Rubber Company, has purchased the O. C. Barber Concrete Products Company's building outside of Barberton, Ohio. It is said that the purchase was made personally by Mr. Seiberling. Although no plans have been revealed by Mr. Seiberling, still it is reported that the Barberton building will be used in connection with the Seiberling plant which is located about a quarter of a mile away.

Falls Starts Mechanical Dept.

On account of the expansion of its mechanical rubber goods business, officials of The Falls Rubber Co., Cuyahoga Falls, Ohio, have decided to establish a department devoted entirely to the manufacture of this class of rubber goods. The company plans to specialize in the manufacture of special molded articles, as well as tubing, channel rubber, mats, bumpers, battery jars and covers. The department will be under the direction of H. B. Denman.

Markings For Rubber Goods Sold In Denmark

Effective Jan. 1, 1924, rubber articles sold in Denmark must be marked with country of manufacture, according to a cablegram, dated Aug. 24, received by the Department of Commerce, from the Assistant Trade Commissioner Harry Sorensen, at Copenhagen. The manner of marking shall be in type of a minimum height, as follows:

*Auto tires	25 millimeters
*Motor cycle tires	20 "
*Cycle tires	10 "
*Soles and heels	5 "
*Rubbers and rubber shoes	5 "
Auto inner tubes	20 "
Gas and water hose	10 "

(*) Marking of these items shall be in raised type.

Other minor rubber products, not mentioned above, are similarly affected by the marking requirement. Further particulars of this law will be issued when the official text is received from Denmark.

No Decision On Ajax's Request

E. L. Fries, treasurer of the Ajax Rubber Co., and the trustees of the Chamber of Commerce of Sandusky, O., have reached no decision regarding the request on the extension of time, asked for by the Ajax officials, to erect a million dollar factory west of that city. Mr. Fries admitted that the tire business is brightening, the sales for July being better than those for June. A decision might be expected within a reasonable period of time.

News Briefs

Residents of Florida, and especially those of Miami, dispute the assertion that the only rubber plant in America grows in Texas. They claim that guayule is not the only rubber producing plant to grow uncultivated in North America, and in supporting their contention they mention the fact that a tree formerly stood in Miami opposite the present site of the Pershing Hotel that secreted a white milky juice, or latex, which gave immediate evidence of elasticity when worked between the thumb and forefinger. In commenting upon this the Savannah News says: "In view of such visible evidences of proof that rubber trees already grow in Florida there doesn't seem to be much doubt that rubber could be produced commercially if the effort were earnestly and honestly made."

* * *

"Commercial Uses of Rubber" constituted the subject of a talk which John J. Voorhees of the Voorhees Rubber Manufacturing delivered before the Lions Club, Jersey City, recently. Toward the end of his address Mr. Voorhees displayed several rubber products little known to the American public — namely rubber molds for making candy and tubes in which spaghetti is made.

* * *

W. O. Rutherford, vice-president of B. F. Goodrich Rubber Company and the president of The Rubber Association of America and the Motor and Accessories Manufacturer's Association, is now on the Pacific coast. His itinerary calls for a visit to California, as well as a swing up into Washington, Oregon and British Columbia. While in Spokane and Seattle Mr. Rutherford will be the guest of W. D. Allbright, district manager for the B. F. Goodrich Co. with headquarters in Seattle.

* * *

Egyptians are now manifesting an interest in the manufacture of rubber articles. Not long ago six students of the University of Cairo arrived in Akron. Being accompanied by L. E. Warford, special agent of the United States Department of Commerce, the students were admitted to a number of the Akron factories. These students have also just completed an eight months' course in the Michigan state automobile school at Detroit.

* * *

For the first three months of the current year the Netherlands East Indies exported 20,000 tons of crude rubber, an increase of 50 per cent over the same period of 1922. *The Straits Echo* thinks this an "impossible situation". While the British are restricting exportation of crude rubber, his Dutch neighbor is making up the balance. This is said to be a very disheartening situation — that is, so far as the British are concerned.

* * *

Akron reports state that fully 8,000 men are now idle in that city. This compares with 18,000 in 1922. At present some of the smaller rubber companies are more active than the larger ones, and are said to be absorbing men released by the big plants.

* * *

Tire dealers throughout the country are manifesting exceptional interest in the stand taken by William O'Neil, vice-president of the General Tire and Rubber Co., in which he urged a concerted stand on the advisability of tire manufacturers publishing price changes. It is stated that Mr. O'Neil received 4,500 letters from dealers, and only a few have argued against discontinuing this kind of advertising. The other 4,497 dealers have lined up with Mr. O'Neil.

* * *

The forged rubber coupon question is still an important problem in the Federated Malay States. At a recent court hearing in Penang two Chinese were accused of forging several rubber coupons of five pikul denomination.

* * *

The Motor and Accessory Manufacturers Association with headquarters in New York City will hold their annual convention in the Copley-Plaza Hotel, Boston, Mass., during the week of September 19-22. Mayor Curley will welcome the delegates and will also give a talk on the city's methods of meeting the problems of motor traffic congestion. H. W. Slauson, Engineering Service Manager, Kelly-Springfield Tire Co., will speak at the advertising session. President Rutherford will preside at the opening session.

* * *

The Republic Rubber Co., Youngstown, O., reports that its mechanical rubber goods business for the current year has increased 100 per cent, compared with the volume for the same period in 1922.

MILWAUKEE MEETING OF AMERICAN CHEMICAL SOCIETY

The next meeting of the Rubber Division of the American Chemical Society will be held at the Pfister Hotel, Milwaukee, Wis., Sept. 10-14. Following the Reports and Discussion of Crude Rubber Testing and Physical Testing methods, there will be Committee Reports and a Business Meeting. The following are abstracts of papers which will be read:

A. G. Emery and W. H. Whitcomb.—*Laboratory Vulcanizer with Multiple Compartments.* This paper describes a new vulcanizer designed to accurately determine the rate of cure of rubber compounds in air, inert gases, or steam at atmospheric or higher pressures. The apparatus consists of seven compartments arranged within a steel shell so that all are heated simultaneously by the same steam supply. The individual compartments are arranged so that they can be loaded and discharged independently of each other. In any heat all of the compartments may be filled with the same atmosphere or groups of the compartments may be provided with different atmospheres.

Ellwood B. Spear and Robert L. Moore.—*Effect of Overmilling and Duration of the Curing Time on the Quality of Rubber Compounds.* It has been shown that long milling in the presence of air, even at low temperatures, i.e., 50°C, greatly deteriorates accelerated rubber stocks. It has also been shown that with varying amounts of accelerator (diphenylguanidine) the quality of the cured stock decreases as the time of cure becomes greater. The divergence of opinion in the literature with regard to the effect of milling may be explained on the grounds that there was a great difference in the curing time.

L. B. Sebrell and W. W. Vogt.—*The Acceleration of Vulcanization I—The Influence of the Non-Rubber Constituents on the Physical and Chemical Properties of Rubber Stocks.* (Lantern). The resin acid content of rubber exerts a marked effect upon the physical properties of stocks containing carbo sulfhydryl accelerators, and also plays an important part in accelerating the rate of addition of sulphur. With the hydrogen sulphide polysulphide accelerators the action of the above acids is almost entirely physical. A deficiency of resin acids gives stocks of low physical properties with little or no change in the rate of addition of sulphur. The importance of these acidic substances is perhaps too little appreciated as regards their effect upon the physical properties of many accelerated compounds.

L. B. Sebrell.—*The Acceleration of Vulcanization. II—The Relation of Structure to Curing Power.*

C. Olin North.—*Comparison of Sprayed Rubber with Smoked Sheets in Commercial Tread Stock.* A thorough comparison is made of the many physical properties of two typical tire tread stocks; one being made with sprayed rubber, and the other smoked sheets. The stocks contain a relatively high percentage of carbon black and glue, which is compounded in the form of a glue; carbon black; rubber master batch.

E. N. Cole Coolidge and C. E. Boord.—*Proof that Diphenylguanidine is a 'Hydrosulphide' Accelerator.* Three methods are conceivable for the explanation of the accelerating action of diphenylguanidine. 1. Diphenylguanidine may undergo decomposition under the conditions of vulcanization, the decomposition products thus formed functioning as the true accelerating agents. 2. Diphenylguanidine may form derivatives analogous to ammonium hydrosulphide, sulphide and polysulphides. The primary heat decomposition products of diphenylguanidine are aniline, phenylcyanamide, ammonia and diphenylcarbimide. The secondary products are tetraphenylmelamine and triphenyldicarbimide. None of these substances either singly or collectively will produce an acceleration equal to that produced by an equivalent quantity of diphenylguanidine. Fusion of diphenylguanidine with sulphur does not yield a mercapto derivative. The crude fusion product has less accelerating action than an equivalent quantity of diphenylguanidine. Diphenylguanidine reacts with hydrogensulphide when these two reagents are brought together in the proper concentrations and particularly in the presence of zinc oxide to form a monosulphide. This sulphide is a more active accelerating agent than diphenylguanidine when used in equivalent quantities.

H. W. Greider.—*The Influence of Glue on the Reinforcing Effect of Light Magnesium Carbonate in Rubber.* Data have been obtained showing that one per cent of glue has the effect of considerably increasing the tensile strength and resilient energy of compounds containing up to 15 volumes of magnesium carbonate, but has little influence on their rigidity. The "peak" of the compounding range for maximum toughening effect is also considerably broadened, apparently due to improved initial dispersion of the pigment during incorporation. The increased tensile strength and work capacity are accompanied by enhanced abrasion resistance. The probable influence of glue in modifying the principal factors—particle size, adhesion or "wetting", flocculation, uniformity (particle size-frequency distribution), and particle shape-governing the reinforcing effects of finely-divided pigments in rubber, is discussed.

Ira Williams.—*The Plasticity of Rubber and its Measurement.* An apparatus for the measurement of plasticity of rubber has been devised consisting of two parallel plates between which the sample is placed. A curve showing thickness against time is obtained when the plates are forced together by a known weight. This curve is of the general type $YX^n = K$, where Y is thickness in M.M. and X is time in minutes. In this equation only the constant K varies from one sample of rubber to another, Y and X being dependent variables and n a fixed constant. The value of K is found to change quite rapidly with the temperature, especially in stiff samples of rubber, while the period of rest after milling is found to produce no change. Data are given showing the variation which has been found in different grades of rubber. The press is also adapted to the study of the setting up action of accelerators. If no change in plasticity takes place at the temperature of the experiment, the values of X and Y taken from any point on the curve will give equal values for K. If vulcanization is taking place, successive values of X and Y give increasing values for K.

AKRON'S LOW DEATH RATE

A recent report gives the death rate in Akron as 4.5 per thousand of population while the average for 70 American cities is 10.9. This will come as a surprise to many who thought that the rubber industry was not particularly hygienic, especially in view of the poisonous gases and minute particles usually encountered in mill rooms. This is due as much to the sanitary conditions which have prevailed in the modern rubber plant as to the good health of the young men attracted to the rubber metropolis by the steady work and high wages. Rubber manufacturers in general have adopted strict safety rules and have installed modern hospitals with nurses and doctors in attendance so as to minimize the seriousness of accidents. The industry is to be congratulated on this wonderful showing.

Caught Going and Coming

In commenting upon the report that the British Government purposes to place an import tax upon American made automobile tires Harvey S. Firestone recently said: "With a grip on production of crude rubber and with a contemplated program to levy an import tax on the finished product, England places American manufacturers at a great disadvantage." In substance, Mr. Firestone asserted, that the American manufacturer is caught both ways—going and coming.

Bids For Ideal Plant

Three bids for the Ideal Tire & Rubber Co., were received on Aug. 28, in response to the advertisement of the receivers Newton D. Baker and E. S. Griffiths, for bids on the plant and property on Warner Rd., S. E. One bid, submitted by O. L. Brown, Leader-News Bldg., who represents a group of stockholders, totaled $201,000 for the entire property. The National Mortgage Co., now the Union Mortgage Co., bid $197,000, while H. Muehlstein & Co., of Akron bid $22,780 for the personal property alone. The bids probably will be acted upon soon after court reconvenes sometime after Labor Day.

Fighting Boll Weevil by Means of Airplanes

Army Air Service and Department of Agriculture Cooperate In Aerial Extermination Campaign

THAT airplanes can be successfully employed to apply poison to plants infected by growth feeding insects at a great saving in time, labor and money, was the conclusion arrived at by officials of the U. S. Department of Agriculture as a result of tests conducted last summer at Tallulah, La., when airplanes were used for distributing poison over several cotton fields in that locality to check the ravages of the cotton boll weevil, and more especially the cotton leaf worm, the extermination of the latter having become urgent because it made inroads in southern cotton fields in such vast numbers and began to breed so rapidly that whole acres of cotton were practically kept from blooming.

"Dusting Planes" Efficient and Economical

Not only was the airplane a more efficient means of scattering and applying the poison powder, but it was an economical factor as well, for it was found that only an average of about 2 lb. of calcium of arsenate per acre was required with an airplane, whereas previous to its use an average of 5 lb. per acre were required.

When the devastation among cotton fields by the leaf worm reached alarming proportions, the Department of Agriculture decided that experiments should be made to exterminate this pest through the use of calcium arsenate and paris green scattered freely by hand over the plants during the night or early morning, when the dew on the leaves would cause the powder to stick to the leaf, and thus have some effect. To cover any one cotton field entailed a great deal of labor, because the applications would have to be repeated from time to time.

Airplane experiments were next considered, and through cooperation with the Army Air Service, two planes were rigged up to conduct experiments at Tallulah. It was soon found that one airplane could scatter in a few hours enough calcium arsenate to kill all of the cotton leaf worms on a field; furthermore, the destruction of these leaf worms was practically complete.

The Bureau of Entomology, Department of Agriculture, recently submitted to the Army Air Service a comprehensive report covering these cotton dusting experiments by airplane, same being compiled by B. R. Coad, Entomologist of the U. S. Bureau of Entomology; E. Johnson, Agricultural Engineer, U. S. Bureau of Roads, and 1st Lieut. G. L. McNeil of the Army Air Service. Mr. Coad, who had heretofore opposed the idea of dusting plants from airplanes upon a purely theoretical standpoint, states that he has seen enough to completely change his views on the subject, and is of the opinion that, with the further development of dust feeding equipment, dusting applications can be made for boll weevil control.

The two airplanes sent from the Montgomery Air Intermediate Depot, Montgomery, Ala., to Tallulah, La., to make these tests were piloted by Lieuts. G. L. McNeil, and Charles T. Skow, A.A.S. Lieutenant Skow was replaced shortly afterward by Lieut. C. L. Simon. In addition to the pilots, three enlisted men were detailed on this duty, and the experimental work was further assisted for a few days by the presence of a photographic airplane from the Montgomery Depot, piloted by Lieutenant Arnold.

Distributing Poison Powder

One of the drawbacks in the cotton dusting experiments was the lack of an efficient container or hopper for discharging the poison from the airplane. A hopper of galvanized iron was constructed and fitted inside of the observer's cockpit, which occupied practically one-half of the space, leaving barely room enough for the observer to stand and turn the feed crank. The hopper was provided with a hinged lid for filling from the top and had a capacity of 12,500 cu. in. The first results with this hopper were not satisfactory, as the rush of air caused by the propeller had a tendency to draw back up into the outlet tube of the hopper which was fitted through the bottom of the fuselage, thus interfering with the proper delivery of the dust. Furthermore, the eddies of air created behind the tube tended to draw the dust upward around the fuselage instead of causing it to blow downward.

Another hopper of similar shape was constructed, intended to be entirely automatic in operation, except the opening and closing of the feeder valve, but like its predecessor, it was a crude affair and could stand considerable improvement. No further efforts were made, however, to perfect the mechanical delivery of the poison powder, and the work resolved itself into a study of whether or not cotton plants could be effectively poisoned in this manner.

At the outset two problems were paramount; first, could the planes be operated over a cotton field in such manner that it would be thoroughly subjected to the clouds of dust; second, could the dust be scattered from the plane into the cotton plants and caused to adhere to them in a quantity sufficient to effect insect control? To settle these questions, operations on a more or less plantation basis were undertaken. Two farms, located from 1½ to 5 miles from Tallulah, were selected for the study. A landing field was located near the center of what is called the Shirley Plantation. Both of these farms were heavily infested with cotton leaf worms during the first generation, and a very large number of these pupated successfully in the few fields which had been practically stripped of foliage by that generation. These pupa matured and the eggs laid by the adults started hatching about Aug. 20. The number of adults became so exceedingly great that the infestation of worms which developed proved to be one of the heaviest ever noted by the writers. Practically all of the plants were absolutely covered with eggs, and as these hatched some fields were found to have apparently an average of about fifty worms to the plant at the very outset.

Experiences in Operation

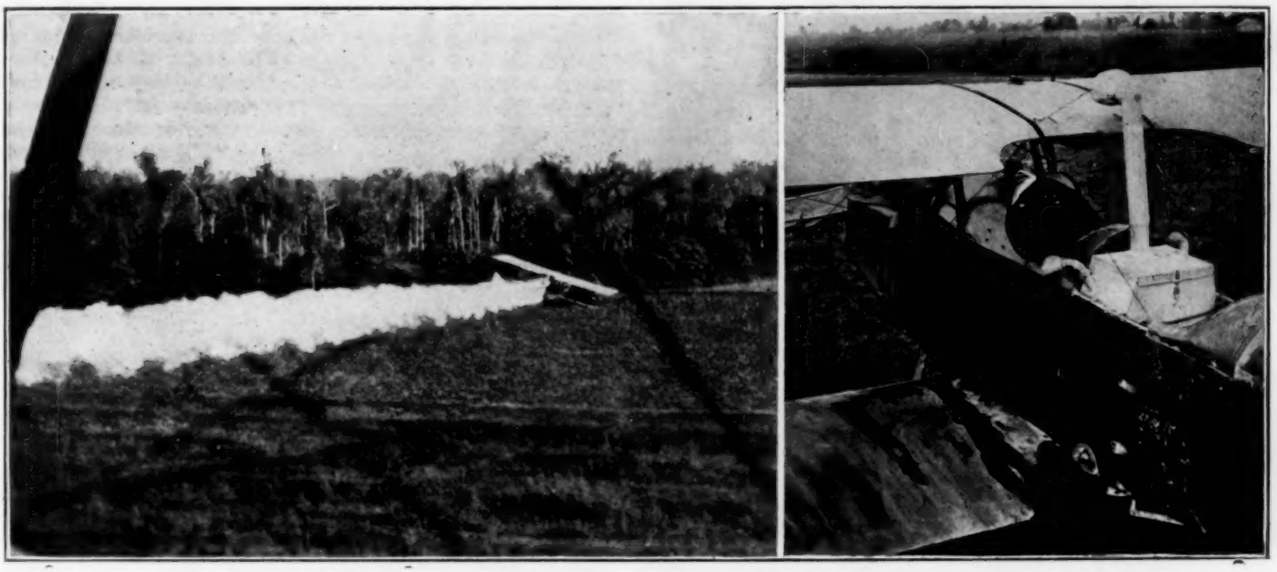
The first studies conducted were for the purpose of noting the behavior of the dust in the air. In ordinary methods of poisoning, successful dusting can be done only when the air is calm and its success is greatly enhanced by the presence of moisture on cotton leaves. For these reasons, ordinary cotton dusting has become almost entirely a nocturnal affair, starting usually from 6 to 8 o'clock in the evening and continuing in the morning until the dew dried from the leaves and the breeze sprung up, which was usually sometime between 6 and 8 o'clock in the morning.

The first cotton dusting flights furnished an absolute surprise for all concerned. It was found that when the calcium arsenate was dropped from the plane it was immediately broken up into a circular cloud which was quickly blown down among the plants. This was obviously due to the tremendous air blast created by the slipstream of the propeller. This blast was so terrific that the powder encountering it became entirely subjected to its force, and the effect of ordinary air conditions was very largely overcome. Throughout the experimental period, flights were made at varying elevations, ranging from 5 to 50 ft. above the cotton plants, and while it was sometimes possible to distribute the dust down among the plants from even as high as 50 ft. or more, it was almost always possible to secure a distribution from 25 ft. or lower, regardless of air conditions.

The planes were prepared in the late evening for operation without delay the next morning; then everyone was on the field and the motors were warmed before the first break of day. Just as soon as it was light enough to see to fly, the planes took off, giving a very weird effect in the ground haze. This haze was so heavy that vision did not extend far enough down the field to see them when they left the ground, they seemed to simply disappear in the fog. Thirty feet above the ground

the pilots found that they were out of this fog and that they had perfectly good air and good vision for flying, but from the ground it was very difficult to see the planes operate.

The planes then crossed back and forth over the cotton fields, flying at about the same level as during the daytime earlier in the work, about 15 ft. altitude, and a most curious effect was noted. Instead of a white dust cloud being swept out behind the plane, almost none was visible, although the feeders were wide open and putting out the dust at the usual rate. Flying at this elevation, the planes were inside of the fog of ground haze and they seemed to churn out a channel just slightly larger than the propeller, and the dust delivered was entirely confined by the wall of the fog surrounding this channel and did not spread out at all, merely coming down in a strip which did not cover more than three rows of cotton.



Fighting boll weevil from the air—on the left, a "dusting plane" delivering poison powder 50 ft. above the plants; on the right, close-up of the improved hopper through which the poison powder is distributed

Dusting Above the Fog

In the next flights, made just as soon as the hoppers could be reloaded, different tactics were tried. This time the planes were operated a few feet above the top of the fog, and the behavior of the dust changed entirely. It was blown downward until it encountered the fog, but instead of immediately penetrating through it, it spread out on top of the fog in a layer from 50 to 100 ft. wide. It seemed to remain at this point without motion, and the observers standing around in the cotton field under this fog were puzzled to know what would become of the dust. It could be observed on the fog for some moments and then it seemed gradually to disappear. About the same instant, however, everyone in the cotton field noted that the air was absolutely filled with fine, almost invisible particles of dust falling to the plants. Furthermore, after a couple of minutes the plants which had been perfectly green before presented the whitened appearance of a very heavy dusting. It would seem useless to fly the plane within the ground haze, but when the dust is distributed on top of this fog it apparently is spread very thoroughly and settled on the plants in an effective manner. More studies, however, must be conducted on this point before any definite conclusions can be reached regarding operating under these conditions.

Analyses disclosed the fact that an astonishing amount of poison adhered to the cotton plants over a very wide path under atmospheric conditions such as to make it absolutely impossible to use a ground dusting machine and successfully treat the plants. The exact cause of this adhesion can only be guessed at, but judging from observations which have been made on the efficiency of different types of ground machines, with varying velocities of air blast, it seems quite possible that this remarkable result is again due to the tremendous blast of the propeller. From studies made it was evident that calcium arsenate dust could be blown down from an airplane onto the cotton plants at almost any time of the day and made to adhere to the plants in sufficient quantity to apparently effect insect control.

Time tests showed that it required 2 min. 15 sec. to empty a hopper containing 120 lb. of calcium arsenate, during which time the plane was operating at an average speed of 84 m.p.h., covering 3.3 miles. The average width of the strip covered with powder on these tests was 150 ft., showing that only 2 lb. of poison were utilized per acre, is in decided contrast to the ordinary performance of cotton dusting, when the amount of powder used per acre is from 5 to 6 lb.

Experiments were also made in dusting cotton plants with paris green. This material, however, flowed so rapidly through the opening in the hopper that the plants received too heavy a dosage, and were in many cases completely burnt up as a result. After a number of experiments in mixing the paris green with other ingredients it was found that a most effective mixture was one part of paris green, one-half part of lime and five parts of white flour. This combination proved to work quite satisfactorily in the plane, and spread through the cotton and adhered to the plants very nicely. As far as worm control is concerned, the effect of the paris green was much more pronounced than any other chemical utilized, since paris green is much more toxic to these larvae than other arsenicals. In every instance practically complete control was secured immediately after such applications, and it was thus shown that the instances of partial control with either calcium arsenate or lead arsenate were due to the lower toxicity of these materials rather than to faulty distribution.

Experiments Highly Promising

The only observation made on the effect of these poisons on the boll weevil was a rather casual one, but significant in a way. Neither of the two farms had been poisoned during the season, and weevils were exceedingly abundant on both. In fact, for a period of fully two weeks or more before the first airplane poisoning was done the weevils had so thoroughly infested both plantations that not a cotton bloom was visible. This condition persisted throughout the beginning of the experiments, but by the time nearly all the fields on the two properties had received one or two applications of calcium arsenate for weevil control it was suddenly noted that cotton squares not infested with boll weevils were becoming fairly common, and by the end of the experimental period both plantations were blooming rather freely wherever the poisoning had been applied. Of course, this cannot be positively accredited entirely to the dusting, since it quite frequently

happens that when the weevils have very heavily infested a field for a few weeks they leave it in search of new food and give it a period of rest during which a few blooms may struggle through to opening, but certainly considerable weevil control had been secured, since the blooming of these properties was much more pronounced than on other adjoining fields where no applications had been made. Furthermore, this late blooming did not develop on the few fields which had never developed sufficient worm infestation to require poisoning.

In conclusion, the report states that the studies made suggested many possibilities for future consideration. These studies were of a purely preliminary nature, but they did show quite definitely that the dust poisons could be effectively distributed over the cotton plants as far as worm control is concerned. Whether or not this distribution was sufficiently thorough to effect boll weevil control is another problem which must still be determined, since it requires much more thorough treatment to control the weevil than the worm. The results secured, however, justify rather optimistic views regarding the possibility of developing this method to the point where it can be successfully used against the weevil, especially since every step of the work conducted was in its most rudimentary and crude stage, and a great improvement in efficiency can be made in many ways.

Whether or not it will ever prove practicable to undertake commercial treatment of cotton fields for boll weevil control with the airplane is a question which has not yet been settled, but the results secured certainly warrant further consideration. Financially speaking, the use of the airplane does not seem to be out of the question. In fact, there is considerable possibility of pronounced economy as compared with ground machines. Furthermore, it has the advantage of centralizing the control of the operation and placing the whole thing on a more skilled basis which would undoubtedly greatly tend to increase the quality of the results attained. On the other hand, no farmer can afford to buy a single plane and figure on dusting his cotton, since it is absolutely not safe to place all of the eggs in one basket in this manner. Motors will go wrong and cotton poisoning is an operation which cannot be delayed when needed. On this basis the operation could be only considered as a community affair or for planters whose acreage would be large enough to justify purchasing more than one plane. In reality, to organize in safety, one plane should be provided in reserve for every one or two which are kept in flight. All of these are questions which can be worked out only by time and trial, but many districts in the south have now reached the point in public sentiment where the desirability of community weevil control can be seen, and it is only by some such methods as the use of the airplane that such community poisoning can be even considered in the near future.

Further experiments are being conducted this summer in Louisiana, using DH4B airplanes instead of the JN's. It is expected that better results will be obtained, since efforts are being made at the present time to provide a more suitable and efficient type of apparatus for distributing the poison powder.

The Last Stage of the Mennen Case, Which Establishes Some Important Law

I have kept the readers of these articles continuously informed about the various stages of the Mennen case, as they have occurred, because I considered it one of the most important of the legal controversies that have occurred between the Federal Trade Commission and business interests. Another stage, the final one, has now been reached. Each time I have discussed this case I have felt it necessary to briefly review it from the beginning in order that the reader might have a clear understanding of the whole case. This wastes some space, perhaps, but it makes for complete comprehension at every point.

The latest development in this case, as I have said, the final one, is that the United States Supreme Court has refused an appeal to the Federal Trade Commission. This confirms the decision of the United States Circuit Court of Appeals and establishes for all time the law of this phase of the relations between manufacturers, jobbers and retailers.

Now just a word or two to bring the matter up to date. The Mennen Co., manufacturers of various toilet specialties, had a peculiar method of doing business. Most manufacturers have a schedule of prices based on quantity, and every buyer ordering a certain quantity gets the price made for that quantity, without regard to whether he is jobber, co-operative buying organization or individual retailer. The Mennen Co. based its schedule of prices on the character of the buyer. If a jobber bought 100 cases, for instance, the price would be so much, the same to every jobber. If a co-operative buying exchange, or an individual retailer bought 100 cases, the price would be different than the jobber's price, in fact, somewhat more than the jobber's price. Thus as between different 100-case buyers the usual uniformity was entirely lacking.

The Federal Trade Commission said this was unfair competition, unlawful preference and discrimination among buyers of the same class, and brought suit. The case was heard before the Commission, which decided that the law had been violated and ordered the Mennen Co. to give every buyer who bought the same quantity the same price. The company appealed to the United States Circuit Court of Appeals, which reversed the Commission flatly and held that everything the Mennen Co. had done was legal. The Federal Trade Commission then appealed, or tried to appeal, to the United States Supreme Court, but has failed in doing so, and the case is now closed. The appeal failed because the Supreme Court doesn't have to allow an appeal in these cases if it doesn't want to, and in this case it refused. Appeal in a Federal Trade Commission case, in which the United States Circuit Court of Appeals has acted, is a matter of grace, not of right, and while the Supreme Court handed down no opinion in refusing the appeal, it evidently approved the law as laid down by the Circuit Court of Appeal court.

The law is therefore fixed and settled throughout the whole United States that a seller of merchandise doesn't need to make the same price to all buyers who buy the same quantity, notwithstanding Section 2 of the Clayton Act, which provides that "it shall be unlawful for any person engaging in commerce, in the course of such commerce, either directly or indirectly, to discriminate in price between different purchasers of commodities, * * * where the effect of such discrimination may be to substantially lessen competition or tend to create a monopoly in any line of commerce." It is now the law that a seller may divide his quantity buyers into other categories and classes—the Mennen Co. said it gave the jobber a better price because he performed a greater service than the pool buyers—and give one class one price and another class another price. It is now the law—although this part has always been the law—that a seller may refuse to sell one class or the other on any terms at all, if he has no monopoly.

The only thing that appears to be necessary under this newly established law is some logical reason for giving one 100-case buyer one price and another one another price. The Mennen Co.'s reason was that the jobber performed more service than anybody else, therefore was entitled to a lower price. Any other reason equally convincing would doubtless be sufficient to justify discriminating selling prices under the Mennen case. And if the seller has no monopoly, his right would probably be upheld to do almost any old thing he liked with his trade without any reason at all except policy—refuse to sell some at all, sell some at one price, others at a different price, some on one set of terms, others on entirely different terms. None of this is a violation of the Clayton Act unless the effect may be to substantially lessen competition or tend to create a monopoly. Naturally, if I am a manufacturer of account books, selling 1-25th of the total output, nothing I can do with my little business can substantially lessen competition or tend to create a monopoly.

The Mennen case unquestionably gives sellers of merchandise a lot more commercial freedom than for years they have thought they had.

(Copyright, June, 1923, by Elton J. Buckley, Esq., 643 Land Title Building, Philadelphia, Pa.)

The Resistance of Rubber to Tearing*

Tearing Resistance Important From Practical Standpoint — Action of Carbon and Aging Interesting

THE resistance of rubber to tearing is a physical property of rubber which up to the present time has not received the attention and study that it is entitled to. The reason for this may be found in the fact that there is more or less difficulty encountered in determining the degree to which rubber resists tearing or shearing, when a cut is made in the sheet with a small knife. That is the method that is generally employed when testing a textile fabric for tearing. That method is used to some extent at the present in the examination of rubberized fabrics and belts. The adherent power of the different layers of rubber and fabric is determined in this way. They are separated for a short distance and then a force is applied to pull them away from each other. The force, required to effect the separation, is an indication of the adherence existing between the different layers of fabric and rubber.

Preparation of Samples

There are three different ways in which the rubber samples may be prepared for the tearing test. In the first place, the force may be applied to the sample in which a lateral cut has been made. Secondly a slit may be cut in the sample and two small hooks may be introduced therein and a force may be applied in a direction perpendicular to the direction of the cut. The third method consists in vulcanizing together two strips of rubber and then carrying out the separation of the rubber strips in a manner analagous to that employed in the determination of the resistance to tearing of belts, to which we have referred above.

The numerical expression for the resistance to tearing of a piece of rubber may be based on the amount of work required to tear a given surface of rubber. It may be based on the elongation that is necessary to accomplish the tearing of the rubber sheet, which has been previously cut or notched in the manner indicated above under certain definite, fixed conditions. Or it may be based on the length of the tear, which is effected by a given force within a given length of time when working with two strips of rubber that have been vulcanized together.

The practical importance of the test is apparent. The resistance of a strip of rubber to tearing is a physical property of the rubber which is distinct from its resistance to tension, but there can be no doubt that the resistance of the rubber to tearing is manifested during the determination of its resistance to tension. In fact practical rubber men know that it is only necessary for the rubber to contain a grain of sand or some other foreign matter, or for it to have a fissure or in fact any fault to cause the rubber to tear. It is evident that this will have a great influence on the other mechanical properties. In any sample of rubber, which is being tested, maximum resistance to tension and the maximum elongation cannot be obtained unless the test sample undergoes gradual, straight rupture without the influence of tearing.

Importance of the Tearing Test

It is thus clearly evident that the tearing test is of significant importance in determining the value of a piece of rubber. It is important in determining the effect that various fillers and pigments have on the rubber composition. Pigments and fillers may have a great effect on this property of the rubber, for which they possess sharp crystals, the tendency for the rubber to tear is enhanced to a considerable degree. On the other hand it must be emphasized that in the case of calendered sheet the resistance to tearing is not the same in both directions in the rubber. It is less with the grain, in the direction of the calendering, than across the grain, perpendicular to the direction of calendering. Attention has also been called that different methods of applying the tearing test will give different results and these methods may be selected to correspond to the different practical applications to which the rubber articles are to be put.

The kind of cut that is made in the rubber sample, which is tested in accordance with the second method described above, in which the force applied is practically constant throughout the test, corresponds to the ordinary abrasion that the rubber undergoes in actual useage, as for example the abrasion that a tire receives. There is probably a direct relation between

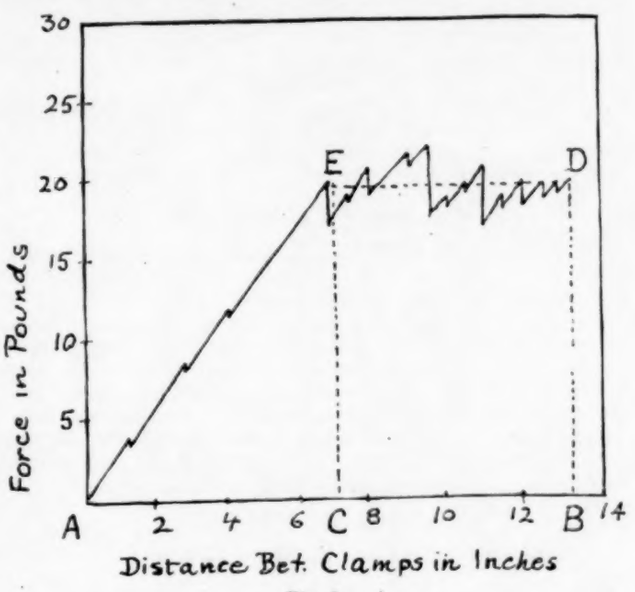


Fig. 1

this kind of resistance to tearing and resistance, to wear and tear or abrasion.

The nature of the cut made in the rubber sample, which is tested in accordance with the first method, described above, corresponds to the condition of tearing by cracking or bursting of the character that takes place when a tire or any air chamber is punctured. The rubber, resistance this sort of tearing, is under strain of tension.

Zimmerman Method of Testing

In order to determine the resistance of rubber to tearing by the method which depends on the nature of the cut made, Zimmerman makes a cut about half an inch long in the center of a slab of rubber. The cut is made in the direction of the grain of the rubber. Two clamps are fastened to the rubber slab and are attached to a dynamometer. The clamps are arranged in such a manner that they pull on the edges of the cut. When the clamps are separated, the rubber tends to tear only in the direction in which the initial cut was made. There is no loss of energy due to the friction of the clamps.

When a sheet of rubber is torn in a dynamometer, both tearing and stretching of the rubber take place at one and the same time. The section of the rubber sheet in which tearing takes place, is stretched and the total energy that is consumed by the machine in producing this action on the rubber sheets is composed of two parts or rather is distributed between the tearing and stretching effects. The tearing takes

*A. D. Luttringer. *Le Caoutchouc et la Gutta Percha*, 11733-5; 11806-8.

place in an irregular manner. When tearing is not effected, then the rubber stretches and a certain amount of strain, corresponding to the energy expended upon, is concentrated in the rubber. This potential energy is set free in part when the rubber starts to tear again. Hence, it is impossible for any fixed relation to exist between the two forces, which tear and stretch the rubber during the time, that is required to tear the rubber sheet in the direction of the original cut made in the rubber sample. At any moment the two forces are in equilibrium with the force that is applied to the rubber externally.

Nature of the Action Undergone by the Rubber

To consider a single force as the index of the resistance of rubber to tearing is not of any value, since it indicates this property of the rubber at one point only. A correct idea of this property of rubber is not obtained unless the average of at least three separate cases is taken, that is the average magnitude of the forces that are applied at three different points in the rubber sample. These points should be distributed along the length of the cut and should be measured there while the rubber is being torn. To this end it is, therefore, necessary to divide the total force applied into the force consumed in the tearing of the rubber and that expended in stretching it. These two forces must be measured at each point along the length of the cut. When the forces have been added up,—the forces that act during the process of tearing,—there will be obtained an average force which acts throughout the length of the cut, and which will be an accurate measure of the work done upon the rubber.

Calculating the Total Force

The work performed by the machine on the rubber sample is equal to the product of the distance which separates the clamps and the average force applied to the rubber. If a curve is drawn, representing the progress of the tearing action, in which curve the distances between the clamps are plotted as abscissae and the forces applied as ordinates, the area included under the curve, between its outline, the X axis and the perpendicular drawn from the last point on the curve to this axis will represent the total work done upon the rubber. In the accompanying figure (figure 1) this area is seen as ABDE. The work is therefore equal to T_1.

$$T_1 = K \int_A^B F_a dx = K_a.$$

In this formula a is the area under the curve and K is a constant function depending on the relative separation of the clamps.

Work Done in Stretching Rubber

After the total work expended on the rubber sample has been determined, the next thing to do is to find out how much of this work was spent in stretching the rubber sample. The stretching effect, which is produced in the rubber at any given moment during the tearing process, is dependent on the force that is required to tear the rubber at that moment, as well as on the length of the cut that has already been torn in the rubber up to that particular moment. The relation is a direct proportion. In other words the relation that exists between the stretching produced in the rubber and the force that is required to tear the rubber is practically that of a straight line in accordance with the well-known law of physics, known as Hooke's law. The stretch or elongation rarely exceed 150 per cent, and is spread over the portion of the tension-stretch curve which takes the form of the letter S. It can therefore be assumed that the elongation at any point whatever through the length of the cut being torn in the rubber sample is proportional to the force that is applied to the strip of rubber.

Once this relation between the force and the elongation is known and understood, it is a comparatively simple matter to find the work done in producing the elongation in the rubber. All that is necessary is to measure the stretch produced in the rubber when the same has been completely torn and the force that stands in equilibrium with that elongation. Thus, from the aforegoing diagram the force (F) is equal to the line CE and the elongation e is equal to the line AC. Then for any elongation or stretch x, we will have the following force, $\frac{Fx}{e}$. The work done will then be sum of all the forces that act during the time that the elongation varies from zero to the maximum e. This may be expressed by the integral equation,

$$\text{Work} = T_2 = \int_0^e \frac{Fx}{e} dx = \frac{Fe}{2}.$$

The work consumed in producing the tearing of the rubber sample will then be the difference between the total work and the work spent in producing the maximum elongation in the rubber. Thus the equation will read,

$$T_1 - T_2 = Ka - \frac{Fe}{2}$$

It will be seen that the formula does not take into consideration the thickness of the sample nor the length of the cut, that is torn in the same. In order to obtain the work in terms of a standard unit, it is necessary to divide the expression $T_1 - T_2$ by the length of the cut L and by the thickness of the sheet of rubber r. Then we have the following equation.

$$T = \frac{T_1 - T_2}{Lr} = \frac{Ka - \frac{Fe}{2}}{Lr}.$$

In this formula F is the force that is applied to the rubber sample at the time that the tearing of the same is finished, which is read off directly from the dial of the dynamometer or which can be determined from the curve diagram. a is the area included underneath the curve and is measured by means of the planimeter. L is the length of the cut, which is measured on the sample, and from which the original length of the first cut is deducted. e is the elongation or stretch, which is equal to the difference between the final distance between the clamps and the total length of the cut. K is the constant of the machine and r is the thickness of the sheet of rubber from which the sample was cut.

Corrections and Importance of Factors

The correction, that must be made for stretching in calculating the resistance of rubber to tearing, is only an approximate figure when calculated by Hooke's law. Nevertheless, it is sufficiently accurate, as the error that is introduced into the calculation is less than the variation in the results obtained or the tearing resistance of different samples of rubber, all cut from the same sheet and therefore all composed of the same rubber mixture.

The thickness of the sample of rubber plays a role of a certain degree of importance in this determination. A thick sample of rubber will give a slightly greater tearing resistance than a thinner sample. It is expedient to use samples of standard thickness, about one tenth of an inch. An allowance of plus or minus 0.015 inch may be made. When the thickness of the samples of rubber is maintained fairly constant, the errors, which are caused by differences in thickness, are negligible. The use of samples of uniform dimensions is very advantageous. It has been found that when these dimensions are 3 by 9 by 0.1 inch very satisfactory results are obtained no matter what the compositions of the rubber mixture is. In samples of such thickness the tear produced may be anywhere from three to seven inches in length.

Speed of Testing

The speed of the testing, that is the rate at which the clamps are caused to move apart, must be taken into consideration in making this test. It is possible to select any desirable speed whatever, even going up as high as five inches per minute. But the speed once chosen must be maintained constant. The rapidity of the motion of the recording diagram should be chosen in such a fashion that it will give a convenient area figure. This speed must naturally be proportional to the speed of separation of the clamps.

Sample Test

The following is an example of how the calculation is carried out for a sample of rubber cut from a sheet made from a rubber mixture containing pure gum and subjected to acceleration during the vulcanization process. The area a or ABDE in the foregoing figure was found to be 2.90 square inches; the thickness of the rubber sample, r was 0.114 inch. The final force, which was required to tear the rubber sample completely, F, equal to BD in the above figure, was 19.5 pounds and the length of the cut made in the rubber sample at the outset, L_a, was 0.5 inch. The distance between the clamps holding the rubber sample, L_2, was 11.25 inches and the final length of the cut produced by the machine, L, was 4.5 inches.

We have $L_2 = (L + L_a + e) = AB$. The elongation e is found from the equation, $e = L_2 - (L + L_a)$ or $11.25 = (4.50 - 0.5)$ or 6.25 inches.

K is the constant of the machine, that is the number of inch-pounds which correspond to a square inch of area on the diagram. K is equal to 55.6. Then substituting in the above equation for T, we have the following:

$$T = \frac{Ka - \frac{Fe}{2}}{Lr} = \frac{55.6 \times 2.90 - \frac{19.5 \times 6.25}{2}}{4.50 \times 0.114},$$

which gives a result of 196 foot pounds.

Notch Method of Measuring Tearing Resistance

The method of measuring the resistance to tearing of a rubber sample in which a notch is cut into the rubber has been standardized. The working of this method is somewhat as follows. A strip of rubber is cut from the rubber sheet about half an inch wide and about five inches long. Two marks C and D are made on the rubber sample so that they are separated by a distance of about an inch, which gives enough room to make three notches or cuts, E_1, E_2 and E_3 (see figure 2). These cuts are separated from one another by distances of one quarter of an inch. The cuts are made so that their depth is about one third of the entire thickness of the rubber sample. The ends of the rubber sample, A and B, are fixed in the clamps of an ordinary dynamometer. The rate at which these clamps move away from each other is maintained constant at 20 inches per minute, until one of the cuts has been torn completely in the transverse direction. The elongation of the rubber sample is noted at the time of rupture. The resistance to tearing is then represented by the increase in the distance between the marks C and D at the time that rupture took place.

It is important to fasten the sample tightly within the jaws of the dynamometer so that every part of its width is held strongly by the clamps and one section of the sample does not receive any more strain than the other. If that is done carefully, then it is seen that when the tearing of the cuts E_1, E_2 and E_3 takes place in the direction EF, the rubber will be elongated or stretched constantly and in an increasing degree as the test progresses.

Results Obtained with Inner Tubes

The following table gives the results that were obtained in the testing of inner tubes used in automobile tires. The figures represent the averages of at least three separate tests in each case.

TEARING RESISTANCE OF INNER TUBES

No.	Tension.	Stretch in per cent.	Density.	Tearing in per cent.	Remarks.
1.	1550	700	1.19	170	gray mixture
2.	1900	800	1.15	140	same
3.	2260	800	1.18	175	same
4.	2075	800	1.10	100	red with antimony red
5.	1950	875	1.06	125	same
6.	2450	825	1.11	300	same
7.	2850	875	0.98	700	oxide of iron red
8.	1975	850	1.26	325	antimony red
9.	2300	825	0.99	480.	pure gray gum

Tearing Asunder Two Strips of Rubber

The third general method of measuring the tearing resistance of rubber is to subject a strip of rubber, which is made up of two individual strips vulcanized together so as to form a single piece, to a tearing force which is applied in such a manner that the two separate strips of rubber are made to part. The details of this method are as follows.

The mixtures are calendered and then a piece is cut off 6 inches in width and one sixteenth of an inch in thickness. This piece is then doubled over so as to form a sample 6 inches wide and one eighth of an inch in thickness. Then samples are cut from this sheet 6 inches in length and one inch wide. When the samples are being cut, some of them are cut with the grain, that is in the direction in which the calendering took place, and others across the grain or the direction of calendering. One side of each strip of rubber is then wetted and wiped off with benzine so that the entire surface is properly wetted in order to assure good cementing of the two strips of rubber. Two strips are then vulcanized together so as to give a finished sample six inches long and one quarter of an inch in thickness. Three separate samples of each rubber mixture are made in the following way. In the first place two strips are selected, both cut in the direction of the calendering; then two strips both cut across the direction of the calendering; finally a sample way made of two strips, one cut in the direction of the calendering and the other across this direction.

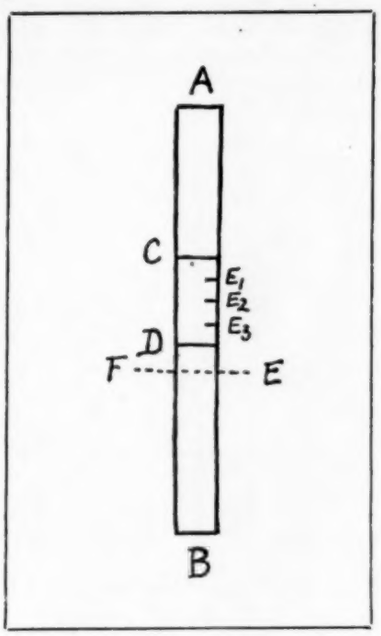


Fig. 2

Details of Process

In order to prevent the adherence of the two strips of rubber at one of the ends, and in order to be able to fasten them properly in the jaws of the dynamometer, it is advantageous to coat the surface of the rubber for a short distance with thin aluminum foil. It is recommended that the mixture be made in the first day, the vulcanization carried out on the next following day and the testing conducted on the next day after. This practice need not be followed out in the case of mixtures which are made up with accelerators. In this case both the mixing and the vulcanization may be accomplished in the same day. This method has been used to study different mixtures made with oxide of zinc as a base, light carbonate of magnesia and purified kaolin, with and without the admixture of accelerators. The accelerator used was piperidyl piperidyl-dithiocarbamate, deposited on a support of zinc oxide.

Results of the Tearing Strength Tests

From the results obtained in the tearing strength tests it was found that on the one hand samples of rubber that are over-vulcanized, and on the other hand, those whose vulcanization is accelerated, tear less easily. The force required to tear the rubber samples, made from strips of rubber cut across the direction of calendering, was not sensibly greater

than that required to tear the rubber samples, in which the strips are cut in the direction of the calendering.

Further studies have been made on this question, among which may be mentioned that made by Tuttle, the results of which are given below. Two rubber mixtures were made. One contained antimony red acid was subjected to a tensile force of 1800 pounds, resulting in an elongation of 825 per cent. The density of the sample was 1.25. The second sample was just an uncertain gray mixture. The resistance to tension was 2,350 pounds, the elongation 825 per cent and the density 1.00. The results that were obtained are given in the following table.

RESISTANCE TO TEARING.

	First Sample.		Second Sample.	
	In the direction of calendering. per cent	In the transverse direction. per cent	In the direction of calendering. per cent	In the transverse direction. per cent
	250	180	550	570
	260	200	600	600
	280	220	575	580
	...	220	...	...
Average per cent	260	210	575	580

Practical Application of Resistance to Tearing

The results obtained in examining rubber articles for their resistance to tearing are of practical interest. In the first case

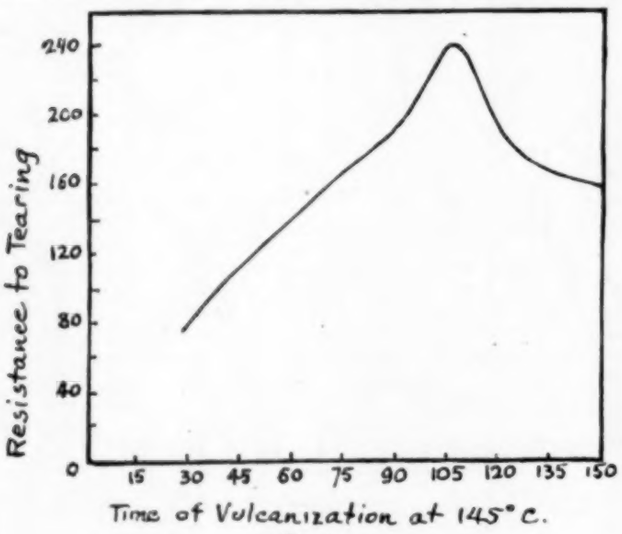


Fig. 3

a mixture of pure rubber was vulcanized without the addition of accelerators. This mixture was made from 92.5 parts of smoked rubber sheet, 7.5 parts of sulphur. The dimensions of the rubber samples were 3 by 9 by one tenth of an inch. The temperature of vulcanization was 145 degrees C. The results that were secured in the experiment are shown in the following table and diagram (see figure 3).

Duration of vulcanization in minutes.	Resistance to tearing in inch pounds per sq. inch
30	80
45	110
60	140
75	165
90	190
105	240
120	190
135	170
150	160

The sample of rubber, which showed the maximum tearing resistance, was vulcanized for 105 minutes. This maximum time of vulcanization corresponds quite well to the optimum vulcanization point as determined by other methods and occurs a little before attaining the maximum tearing resistance.

The curve, shown in figure 3, is typical for all mixtures of pure rubber both when the vulcanization is accelerated and when it is not, and also for mixtures which contain only a little filler.

Mixtures Containing Considerable Fillers

The resistance to tearing of rubber containing a considerable proportion of loading materials depends on the nature and the quantity of the filler used and on the state of the vulcanization. Various mixtures made with an oxide of zinc base were studied. The composition of the mixtures was as follows: sulphur 5.5 per cent, hexamethylenetetramine 0.5 per cent. The temperature of vulcanization was 142 degrees C. The results obtained are given in the following table and in figure 4.

Zinc oxide by percentage in volume.-	Zinc oxide percent by weight.	Resistance to tearing, inch pounds per sq. in. In the direction of calendering.	In the transverse direction.
0.17	1.0	195	195
1.43	7.74	166	166
3.29	16.40	135	130
6.80	29.60	75	74
10.00	38.60	109	103
14.52	49.40	123	159
19.55	58.40	135	200
22.61	62.60	120	350

It may be stated that when the proportion of oxide of zinc exceeds a certain maximum, the tearing resistance of the rubber article, made from that mixture, is decidedly different according to the direction in which the force is applied, that is whether the rubber is torn across the grain or with the grain. All the ingredients in the mixture decrease its resistance to tearing as the proportions of the same are increased, just as in the case of oxide of zinc. The same condition

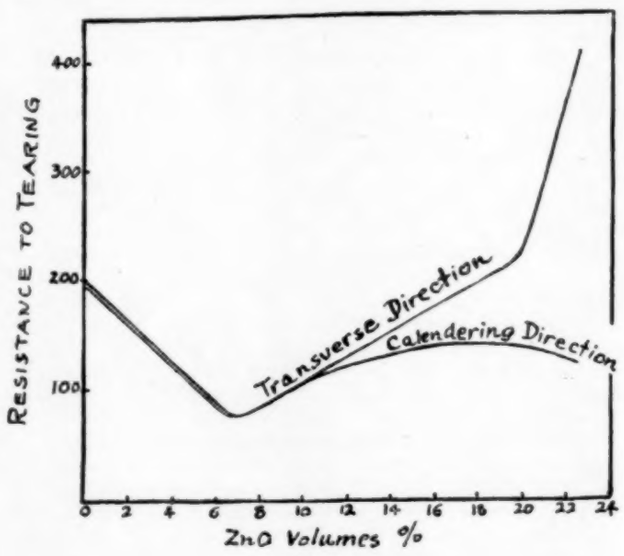


Fig. 4

holds good but to a lesser degree with oils, mineral rubber, and the like.

Conclusions

There are several important conclusions which can be derived from the aforegoing study. One thing is certain and that is that the tearing resistance of rubber is of great importance from a practical standpoint. It may appear that there is no concordance between the results obtained by various investigators, but this is due to the fact that different methods are used to measure this property of rubber and that the results are expressed in different units.

In describing the tearing resistance of rubber it is therefore of prime importance that the method used in the investigation be mentioned and in fact it is advisable to give exact details of the same. It is suggested that it would be interesting to determine the effect of carbon black, added to the rubber mixture, from this standpoint. The fineness of the pigment on the one hand and its structure on the other, whether it is crystalline or amorphous, are very important factors, exerting a profound influence on the tearing resistance of the vulcanized rubber. It would also be interesting to examine the action of ageing, either natural or artificially accelerated, on this property of rubber, as well as the influence of prolonged heating or repeated mechanical working.

The Accelerated Aging of Vulcanized Rubber *

By B. Marzetti

(Translated by C. C. Davis)

AMONG the experimental methods for predicting the behavior in practical use of rubber goods, none is more important than the accelerated aging test.

Rubber has mechanical properties more than sufficient for most uses as long as it is new and unchanged, but regardless of the use to which it is put, there takes place after vulcanization and with the passing of time the phenomenon of aging, with accompanying hardening, loss of tensile strength, etc., so that after a certain period the physical properties are no longer sufficient for the particular use.

This deterioration is often the only reason that a rubber article eventually becomes useless, but more often with the wear and tear it tends to shorten the life of the article. Hence the interest in finding the most resistant material to this inevitable deterioration. But since this deterioration requires so long a time, natural aging tests are unsatisfactory, and artificial aging tests lasting but a few days are essential.

The question then arises of what value an artificial aging test may be made to be. From the work of de Vries, Geer and Pelizzola it is reasonable to assume that though far from furnishing exact data on the behavior of rubber in actual life, the accelerated heat test is at least a criterion or index of such behavior.

The behavior of vulcanized rubber during aging is characteristic, whether the aging is natural or artificial. There is progressive hardening, while the tensile strength, after reaching a maximum, rapidly decreases to a minimum. By breaking samples of vulcanized rubber when they have reached this state, it becomes evident that deterioration is uniform throughout the thickness without any special localization in the outer surface even in samples of considerable size (i.e. 5 x 5mm.) and where aging has continued but a very brief time (less than 24 hours). This property of the aged sample is perhaps one of the reasons why deterioraton of vulcanized rubber has been regarded at least in part as a sort of physical degeneration.

Following this method of reasoning, aging experiments were carried out in closed thermostats heated by alcohol vapor. The temperature was kept uniform throughout the system at 75°C. The heating was done by means of a surrounding jacket with a movable partition so that the samples could be removed. The seal was not hermetical, but was made sufficiently good by means of strips of felt.

But with the introduction of the dynamometric testing machine, serious faults become evident in the method of artificial aging. Repeating tests with identical cured samples did not give similar results quantitatively, and at times the differences were very great without any plausible reason. The curious coincidence was noticed that deterioration was less rapid whenever there were many samples aging in the thermostat at the same time. This observation led to the following experiments.

Identical samples were placed in the same thermostat, some in a receptacle of small volume hermetically sealed, the remainder open as usual. The former deteriorated much more slowly than the latter.

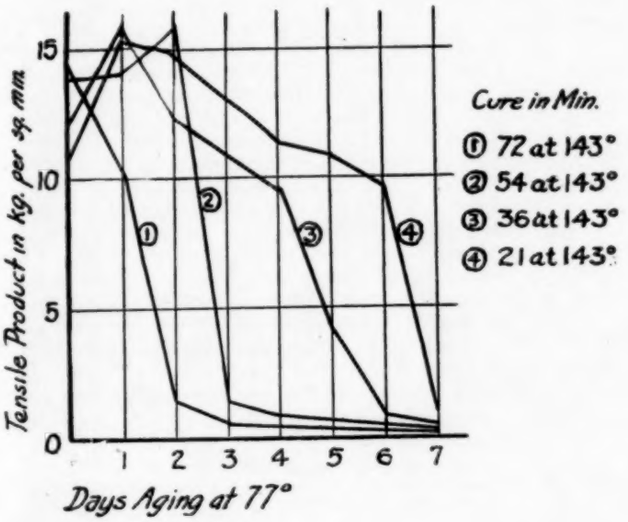
Identical samples were then placed in the same thermostat, some without taking them out of the mold in which they were cured, others exposed as usual. The former did not deteriorate noticeably in the time in which the latter had reached their minimum tensile strength.

Four samples of the same cured rubber were sealed in glass tubes of about 20 cc. capacity, placed in the thermostat and removed after O day, 9 days, 23 days and 41 days. On breaking, the second, third and fourth samples did not show appreciable differences. Compared with the first, they were a little harder and had a little less tensile strength.

Finally samples of the same cured mixture were sealed in tubes, some in oxygen and some in carbon dioxide and placed in the thermostat for a week. A third set was retained for comparison without any aging. *All the samples in carbon dioxide were identical in quality to those not aged, whereas those in oxygen were completely deteriorated.*

There is no doubt from this that artificial aging is an ordinary chemical reaction, and one of oxidation. But the most singular thing was that only a small quantity of oxygen was necessary to produce this deterioration. The sample sealed in this tube with oxygen weighed 3 grams and the capacity of the tube was 20 cc. Therefore *one per cent by weight of oxygen was sufficient to change profoundly the properties of the rubber.*

Comparison of a series of stress-strain curves of a sample



aged progressively to increasing degrees with the curves of the same sample cured to successively increasing degrees showed that the two series of curves were very similar. In both cases the curves were displaced as the rubber continuously hardened. The tensile strength at first increased, reached a maximum and dropped rapidly to a minimum.

Aging is therefore an after-vulcanization produced by oxygen of the air. As in the case of ordinary vulcanization, the first reaction is a chemical one, but this probably extends only to a small part of the mass of rubber, nevertheless is sufficient to alter profoundly the physical properties.

As a result of the tests described, a modification of the thermostat was necessary to insure a constant renewal of the air and yet to maintain a uniform temperature. To this end a thermostat of considerable capacity was used, heated by alcohol vapor on all sides, including the cover. Air entered at the bottom through tubes immersed in the alcohol vapor for a length sufficient to insure its reaching the proper temperature before entering the thermostat, and issued from several openings in the cover. The current of air created was sufficient to heat automatically the system, as was proved by means of comparative tests with increased and diminished draughts. The current of air was filtered through a tower of soda-lime to dry it and thereby prevent acidity.

In such a thermostat the temperature could be maintained about 77° throughout, with variations in places of 1/10 of

* Giornale di Chimica Industriale ed Applicata Vol. V. No. 3, pp. 122-124, March 1923.

a degree. A recording thermometer controlled the temperature and indicated at once the slightest interruption in the heat. A support with many horizontal arms held a large number of samples which in most cases were rings for the Schopper dynamometer. In most tests it was sufficient to remove an aging sample each day.

To give an idea of the uniformity of the results and therefore of their reliability there is included a diagram of aging of four samples of the mixture: slab rubber 100, sulphur 8.

The parameter of aging is the tensile product:

load X (elongation + 1).

It is seen that the life of the rubber is shortened by an increase in the degree of cure.

Recently the aging experiments have been repeated in an enclosed chamber with the object of determining a new point which arose.

Assuming that aging is an oxidation of the rubber, the question arises whether the differing behavior during aging of two cured samples is due to their different rates of absorption of oxygen, or rather to a different degree of tolerance toward oxygen.

Besides the degree of cure, the quality of the crude rubber, the type of mix, etc. influence the aging properties. In the experiments above in the sealed tube with air or with oxygen, if the seal is broken under water, the latter fills one-fifth or all of the volume respectively when the tube has remained in the thermostat a sufficient time to absorb all the available oxygen, assuming that no carbon dioxide or other gas is evolved from the rubber during aging.

A sample of cured rubber of such a weight that it contained one gram of rubber was placed in a bulb of about 125 cc. volume, air passed in after filtering through soda-lime, and the bulb closed. It was immersed in a water bath in a known temperature and an exact reading was made of the barometer. The bulb was then placed in the thermostat until tests showed the same degree of deterioration that had been obtained in the previous aging tests. It was then removed from the thermostat, placed in a bath at the same temperature at which it was sealed, the seal broken and the volume of the water entering measured. The barometric pressure at the time of opening was read, the necessary corrections made and the quantity of absorbed oxygen calculated. The rubber after removal was tested on the Schopper machine to determine the degree of deterioration.

Five vulcanized samples of the same composition were tested in this way: Smoked sheets 100, sulphur 8.

In the following table:

T is the time in minutes of the cure at 143°C.
V is the parameter of physical cure attained, i.e., the load in grams per sq. mm. of the original cross-section necessary to give an elongation of 3.
C is the breaking load of the aged sample in grams per sq. mm.
h is the same time in hours of treatment in the thermostat at 77°C
O_2 is the weight in mg. of oxygen absorbed by the sample containing 1 gram of actual rubber.
v is the ratio O_2/h, the velocity of absorption of oxygen.

T	V	C	h	O_2	v
70	67	120	168	10.4	0.62
103	87	150	132	10.0	0.75
137	102	128	105	11.4	1.08
171	124	130	64	9.4	1.47
206	143	125	39	8.0	2.45

The amounts of oxygen necessary for deterioration were nearly equal, except for a tendency to diminish with more advanced cures, while the great difference between the various samples in their tendency to deteriorate was due almost entirely to their different rates of absorption of oxygen.

Making the same tests with mixings differing in composition or in quality of rubber, there arises the problem of what degrees of cure to compare with one another. Evidently because of the great effect that the degree of cure has on the rate of deterioration, any comparison between two cured samples is without value if the degree of cure is not specified.

A comparison of samples receiving the same cure without taking into account the degree of cure really attained is nevertheless often of practical interest when dealing with mixings varying not too greatly in quality, and a comparison of samples with equal amounts of combined sulphur is of importance in scientific research.

But from a technical point of view it was considered advisable to compare samples which gave the same physical tests. Cures were therefore chosen for various mixes, such that a constant value was obtained for the parameter: load of 100 grams per sq. mm. at elongation 3.

The results obtained with two mixings containing the same smoked sheet with a medium rate of cure were:

	(1)		(2)	
Smoked sheets	100		Smoked sheets	100
Sulphur	8		Sulphur	8
			Organic accelerator	0.5

	T	V	C	h	O	v
(1)	146	104	150	132	9.6	0.74
(2)	15	100	155	336	7.4	0.22

There was reason to believe that at least a part of the high resistance to deterioration with an organic accelerator was due to a greater tolerance for oxygen. But the discrepancy was otherwise. The great durability of the samples cured with the accelerator was due to a much slower rate of absorption of oxygen.

Finally in the mixing: rubber 100, sulphur 8, two different rubbers were tested, one a first latex crepe (1), the other an inferior crepe (2).

	T	V	C	h	O_2	v
(1)	137	107	150	132	10.7	0.81
(2)	150	98	135	78	10.2	1.31

Here as well, the quantities of oxygen causing deterioration were approximately the same, whereas the rate at which the oxygen was absorbed during aging varied.

These are but a few preliminary experiments to develop a method for studying the phenomena of aging. They indicate that the differing behavior during aging of vulcanized rubber is due chiefly to different rates of absorption of atmospheric oxygen.

To reach practically complete deterioration, rubber absorbs a quantity of oxygen which is usually about 1/100 of its own weight.

Résumé

Accelerated aging of vulcanized rubber is one of the most important tests to which rubber is ordinarily subjected in order to have a criterion or index of the change in its physical properties with time.

The present investigation indicates that artificial aging is an ordinary chemical reaction, essentially an oxidation due to an after-vulcanization produced by atmospheric oxygen. Upon the different rates at which oxygen is absorbed depends the differing behavior during aging of vulcanized rubber.

Swiss Market for Rubber Footwear

The greater part of the rubber footwear now sold in Switzerland comes from the United States. During 1922 the imports were as follows:

From	kilos	Swiss francs
Germany	7,200	59,000
Austria	4,300	25,000
France	10,700	68,000
Sweden	5,200	67,000
United States	48,600	303,000
Other countries	3,700	21,000
Total 1922	79,700	543,000
Total 1921	65,200	592,000

Offers made to Swiss buyers should be quoted c. i. f. Antwerp or Genoa, and should be made in Swiss francs. Correspondence should preferably be in German or French. In normal times credit terms are 3 months net or 30 days with 2 per cent discount. When goods are sold f. o. b. New York, they should be entrusted to a forwarding company able to effect their transit to Switzerland without change. Insurance should also be for the whole journey. The Swiss buyer receiving goods c. i. f. Antwerp would prefer that the Antwerp despatch agent receive shipping documents in time to forward goods immediately upon arrival. In case this is prevented by the B/L and invoice going first by way of a Swiss bank for payment, arrangements can always be made for the transportation company to deliver the goods to the forwarding agent without papers. Such delivery saves much time to the buyer.

Foreign Rubber Markets

Condition of Markets in Various Countries — Increasing Opposition From Foreign Manufacturers Met

THE following is a synopsis of trade conditions in foreign tire and rubber markets, as extracted from reports issued by the Bureau of Foreign and Domestic Commerce, Rubber Division, Washington, D. C.

Consul Charles L. Hoover, Batavia, Dutch East Indies reports that during 1922 there were imported into Java and Madura 248,124 automobile tires and tubes, compared with 221,929 in 1921 and 247,823 in 1920. France lead in 1921 with 69,524, while Japan and the United States were second and third respectively. Imports of tires and tubes in 1922 from Japan were 84,479; United States 65,773; France 58,606; Germany 23,123; Italy 4,203. There are about 25,000 automobiles in Java and Madura, tire consumption averaging about 5 tires and tubes a car.

India: A Calcutta firm states the following regarding the distribution of American tires: "We regret that it is not worth while to import these tires (American makes) until the present situation as to financial stringency improves. Under present conditions no new goods can succeed unless their prices are competitive."

Mexico City: The tire market is highly competitive in Mexico City and the best results appear to be had by those American tire concerns which maintain their own branches there.

Tampico, Mexico: Consul James B. Stewart states that if the high import duties on tires continue in force, Mexican made tires will secure a foothold. European tires can be imported cheaper than American owing to more favorable exchange ratio.

Belgium and Holland: The German Continental and British Dunlop have reduced prices 8 per cent, the level established by Michelin.

Rome, Italy: Wimpassing tires recently have been placed on sale in Italy. These tires are manufactured by the Fabriken Vereinigte Gummiwaaren of Wimpassing near Vienna. Although manufactured in Austria, a country with a heavily depreciated currency, these tires have not been put on the market at prices which cut under the Michelin scale.

American Distribution Policy

Some American tire exporting companies are following a sales policy in Europe by which stocks of tires are maintained at different European points in consignment to banks or warehousing firms. Agents are authorized to draw upon these stocks usually only against cash payments; bankruptcy of an agent thus causes no monetary loss to the company. This policy has been successful in keeping certain American tires on the European market usually without undue risk arising from goods becoming unsaleable. Under prevailing conditions of European competition, with certain companies selling at or below cost (notably Pirelli, and on occasion Michelin and Continental) in order to maintain their position, certain American firms have been able to remain in European markets, even if the profits derived in one market are sometimes lost through liquidation necessitated in another market. The aim of this policy is to earn expenses and maintain European representation until business conditions will again permit operations at a profit.—Assistant Trade Commissioner Elbert Baldwin, Warsaw.

Venezuela: The field is not especially promising for the agency of a new brand of tires. It would be good policy to ship a new agent only a small supply. Many dealers are well stocked.

Northern Mexico: In the consular district which adjoins the State of Arizona there are 514 passenger cars and 287 trucks and busses. Most all owners of these vehicles visit American border towns—Nogales, Naco, and Douglas, Arizona—and purchase their tires and tubes there.

Guadalajara, Mexico: American tires have a firm hold on this market. French Michelin and the German Continental occupy third and fifth places respectively.

Dutch East Indies: The market here for pneumatic tires is entirely demoralized on account of the competitive methods which are being used by various European and American manufacturers.

Java: American tires are gaining ground, although strenuous between Michelin, Dunlop, and two American makes. Unfair competitive methods prevail. Cooperation between American manufacturers is urged.

Ceylon: This is a fair market for rubber tires of all sizes. There are approximately 3,500 motor cars in the island, cord tires being demanded. Fully 25,000 casings were imported during 1922, 2,278 coming from the United States, while 11,552 came from Great Britain. France is second in this field.

German Tire Prices Mount

The June 1 prices of all German made tires were approximately doubled by the third advance during the month, effective June 18. The domestic retail price for a cord casing 765 x 105 on June 18 was 1,105,000 marks, the inner tube retailing at 201,000 marks. On June 22, domestic prices were further advanced by 42 per cent on casings and 37 per cent on tubes. (Assistant Commercial Attache Donald L. Breed, Berlin)

Australia: Trade discounts are 20 and 5 per cent with an additional 5 or even 7½ per cent when necessary. Two Australian manufacturers, Perdriau and Barnet Glass, actively solicit business directly with the consumer, allowing him full trade discount. Michelin is doing everything possible to avoid selling direct to the consumer, while two American concerns are reconstructing their sales policies. Secret discounts are frequently given. Perdriau cord tires are being offered in Melbourne in both metric and inch-clincher and inch-straight side tires. Perdriau are being placed on the market prematurely to meet competition from Michelin and American made cord tires.

Tire Market in Greek Macedonia

Two American tires are selling ahead of Michelin in Saloniki, Greece, according to a report from Consul Leland B. Morris. A small trial order of Pirelli tires has just been received; this order was placed by Sahak Kiredjian, Rue Velissariou. Tire prices continue to fluctuate in accordance with exchange rates. Retailers here receive 15 per cent to 18 per cent discount from distributors at Athens, and give discounts of 5 per cent to 10 per cent to large customers. At present competitive prices, the good quality of American tires assures them of a good share of the trade.

Colombia: American tire exporters control about 90 per cent of this market. Sales in 1922 totaled $120,264, against $64,314 in 1921. There are about 2000 passenger cars in Colombia together with 250 motor trucks and 75 motor cycles.

Marking of Imported Tires in Spain

A Royal Order of May 19 has now been published reforming all of the existing orders and establishing the following regulations with respect to the circulation of imported and nationally manufactured tires:

After June 1, 1923, all solid tires without metallic rims, pneumatic tires and inner tubes of rubber for all classes of vehicles, in order to circulate freely throughout national territory, shall, in the case of those of foreign manufacture, conserve the custom house mark placed upon them by the custom house through which they were despatched at the time of their entry into Spain, and, in the case of those of national manufacture, the factory mark required by Case 2 of Article 251 of the Customs Ordinances. In the case of the national

tires, etc., the factory mark, in the case of solid and pneumatic tires, shall be made in relief and shall form part of the body of the merchandise, and, in the case of inner tubes, the mark shall be made in indelible ink or in the form of a sealed band (which, however, must not be like those employed by the custom house), as it is impossible to mark inner tubes by relief brands on account of difficulties of manufacture.

The custom house marks (*marchamos*) must be of aluminum, of a form and size similar to those of pasteboard which are used at the present time, and shall be similarly marked, one being fastened to each solid or pneumatic tire or inner tube by means of a wire, the wire to be covered by vegetable fiber textiles of the national colors in the form of a loop which shall circle, without going through, the mark and the ends of which shall be fastened under the mark. In the case of inner tubes which are brought in sacks or guaranteed boxes, sealed by the manufacturers, the custom house marks shall be placed on the outside in such a way that it shall be impossible to open the container of the tubes without breaking the wire which holds fast the official custom house mark.

Solid and pneumatic tires and inner tubes of national production shall bear on their factory mark, in Spanish and without any expression whatever in another language, the name of the manufacturer or firm name and the town in which they are manufactured.

In the case of the imported article, the customs authorities shall make note of the factory number of the solid and pneumatic tires and inner tubes, and in case they do not bear numbers, of the fact that they do not, according to Case 6 of the Royal Order of February 10, 1922. These annotations shall be authorized and sealed by the customs officials and shall be joined to the other customs documents, with the formalities prescribed by article 91 of the Revenue Ordinances. When such merchandise is despatched with customs coupons of the series G, No. 7, the customs inspector shall note, under his responsibility, on the coupon and the stub of the document, the factory numbers of the imported articles or the fact that they lack them.

After June 5 and up to June 25, 1923, dealers and warehouse owners of the articles above-mentioned shall present a record of the stocks which they have to the custom houses and inspection houses mentioned below. These records must show, in the case of those articles despatched directly, the number and class of the customs duty documents, of the custom house, agent, or commission agent, and the date of importation. In other cases, the importation shall be according to Royal Order of September 6, 1922, giving the factory numbers of the articles. One copy of these records shall be kept by the local custom house and another shall be sent to the Directorate General of Customs. Once note is taken of these records in a special register, the customs authorities will proceed to the marking of the stocks.

England: Dunlop is widely advertising its tires in England, urging the English to buy English tires on the following grounds: Use of foreign tires means unemployment; the 1922-23 improved construction are available in ample quantity to meet every demand; British tires cost no more than foreign makes.

British South Africa: Thirty-two makes are sold in this market, although the bulk of the demand is supplied by five companies, three of which are American.

Burma: Michelin and Dunlop are the leading competitors in this market.

Malaya: Trade prospects are good owing to improved business conditions. American makes occupy third, fourth, sixth, and eighth positions in this market.

The Foreign Rubber Market

Malta: Market is limited, total value of rubber goods imported in 1922 was $7,977.

Cyprus: Small market for rubber shoes, light rubbers, canvas rubber-soled shoes, raincoats and mackintoshes. These goods are mostly imported from England.

Germany: The demand for every kind of rubber article has been affected by the general economic condition in Germany and by the occupation of the Ruhr. Orders from dealers have decreased, stocks are being sold without immediate replacement. Orders from the occupied district are few. New orders for foreign accounts are being booked—but they are small.

Colombia: This is one of the markets in which American rubber manufacturers hold almost complete sway. The rubber goods trade is divided as follows: automobile tires, 50 per cent; rubber footwear, 25 per cent; mechanical rubber goods, 12½ per cent, and various other classes, 12½ per cent. Total value of all rubber goods shipped to Colombia in 1922 was $237,247, against $150,358 in 1921, and $369,210 in 1920. Shipments of rubber soles and heels during first quarter of 1923 totaled $12,284, against $4,138 for the corresponding period in 1922. There is a good demand for American made rubber shoes and boots. Practically all the rubber mechanical goods used in Colombia is imported from the United States. Druggists' rubber sundries as well as rubber toys, bottle syringes have a limited market, but are said to be rapidly growing in popularity. A distinctive feature of the Colombian market is that customs duties levied on imports of rubber goods are very low.

Summary of Rubber Exports for July, 1923

Compiled by the Department of Commerce

RUBBER BELTING, HOSE, PACKING, AND THREAD.

	Rubber Belting		Rubber Hose		Rubber Packing		Rubber Thread	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Total	255,159	149,217	423,501	173,398	128,970	60,303	62,117	68,679

PNEUMATIC CASINGS AND SOLID TIRES.

	Pneumatic Casings				Solid Tires			
	For automobiles		Other		Automobiles		Other	
	Number	Dollars	Number	Dollars	Number	Dollars	Pounds	Dollars
Total	98,290	1,097,660	5,698	18,150	6,784	167,797	61,104	15,265

RUBBER FOOTWEAR AND SOLES AND HEELS.

	Boots		Shoes		Canvas shoes with rubber soles		Rubber soles and heels	
	Pairs	Dollars	Pairs	Dollars	Pairs	Dollars	Pounds	Dollars
Total	47,797	88,529	126,488	109,671	309,296	233,339	197,773	62,592

HARD RUBBER GOODS AND DRUGGISTS' RUBBER SUNDRIES.

	Druggists' Rubber Sundries		Battery jars and Accessories		Other Electrical Supplies		Other hard rubber goods	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Total	55,300	55,171	13,468	7,014	36,318	7,946	20,835	27,982

PNEUMATIC TUBES, REPAIR MATERIAL, MANUFACTURES OF RUBBER NOT ELSEWHERE SPECIFIED

	Pneumatic Tubes				Tire Repair Material		Rubber Manufactures	
	Automobiles		Other					
	Number	Dollars	Number	Dollars	Pounds	Dollars	Pounds	Dollars
Total	99,569	168,057	3,797	3,770	68,864	32,635	494,841	277,785

COATED OR WATERPROOFED FABRICS.

	Oilcloth (not floors)		Coated or Artificial Leather		Waterproofed Autocloth		Waterproofed Clothing	
	Sq. yards	Dollars	Sq. yards	Dollars	Sq. yards	Dollars	Sq. yards	Dollars
Total	635,588	170,434	331,134	227,262	145,545	95,135	62,738	53,418

RECENT IMPORT DUTIES LEVIED ON RUBBER GOODS

Austria

The Austrian import tariff is the same for all countries—all imports being subject to the conventional rates of duty where such are provided.

Import duties are stated in gold and payable in gold or its equivalent in paper currency, according to the gold parity published weekly by the Government. The last published rate for customs purposes was 10,000 paper crowns to one gold crown. The gold crown is equal to $0.2026; the paper crown was quoted at $0.0000141/8 on June 9, 1923.

Importation of most rubber goods can be effected only under special license. Goods requiring license fall under Item Nos. 309, 311, 312, 313, 314, 315, 316, 317, and 320 of the following schedule. It is understood that permission to import restricted goods can usually be obtained. Postal parcels of a value of not more than 500,000 crowns (paper) each may be freely imported regardless of any existing prohibition regularly applying to such goods imported by other means of transportation.

Unless otherwise mentioned, the dutiable weight shall be the gross weight, less the tare allowance expressed in percentages of gross weight, as given at the end of each tariff number according to kind of packing. The kilo is equivalent to 2.2046 pounds avoirdupois.

Tariff No.	Articles.	RATE OF DUTY (Crowns per 100 gross kilos) GENERAL.	CONVENTIONAL.
XXX	*India rubber and gutta percha and wares thereof:*		
304	India rubber, gutta percha (also balata gum), raw or refined; waste thereof, old used pieces of wares manufactured therefrom; india rubber regenerated from rubber waste (Mitchel's gum) ..	Free.	....
305	India rubber, dissolved	6.00	....
306	India rubber, paste Tare—14% in cases and casks; 9% in hampers; and 4% in bales.	10.00	....
307	India rubber threads, not covered with yarn (also flat, not more than 3mm. wide)	3.60	....
308	Sheets, unvulcanized, cut, coated, rolled (patent sheets) ..... Tare—14% in cases and casks; 9% in hampers; and 4% in bales.	40.00	40.00
309	Wares made of patent sheets, not specially mentioned, vulcanized or not, combined or not with fine or common materials ..... Tare—14% in cases and casks; 9% in hampers; and 4% in bales.	130.00	100.00
310	Children's toys and games of soft india rubber, combined or not with fine or common materials . Tare—14% in cases and casks; 9% in hampers; and 4% in bales.	100.00	80.00
311	Boots and shoes, combined or not with textiles of all kinds or with other materials ... Tare—14% in cases and casks; 9% in hampers; and 4% in bales.	120.00	....
312	Wares of soft india rubber, not specially mentioned, combined or not with fine or common materials . Tare—14% in cases and casks; 9% in hampers; 4% in bales.	100.00	80.00
313	Hardened india rubber (solid or hard as leather) in sheets, rods, and tubes, polished or not, but not further worked ... Tare—14% in cases and casks; 9% in hampers; and 4% in bales.	30.00	30.00
314	Wares of hardened india rubber, not specially mentioned: (a) Rough pressed, the pressing seams being visible	84.00	84.00
	(b) Other, combined or not with fine or common materials	135.00	100.00
	Tare—16% in cases and casks; 13% in hampers; and 6% in bales.		
315	Woven and knitted materials covered, impregnated, or coated, with india rubber or with internal layers of india rubber, if the yarns used therein consist: (a) Wholly or partly of silk, floss silk, or artificial silk	200.00	....
	(b) Of other textile materials, also felt of such materials	130.00	....
	Tare—13% in cases and casks; 9% in hampers; and 6% in bales.		
316	Elastic fabrics, knitted wares, and haberdashery, if the yarns used therein consist: (a) Wholly or partly of silk, floss silk, or artificial silk	200.00	....
	Shoe elastic ..	200.00	180.00
	(b) Of other textile materials: (1) Shoe elastic	170.00	165.00
	(2) Other ...	185.00	180.00
	Tare—13% in cases and casks; 9% in hampers; and 6% in bales.		
317	Clothing and other articles made with stuck or sewn additions of the materials mentioned in Nos. 315 and 316 are dutiable as these with an addition of 20% (Conventionalized). Tare—13% in cases and casks; 9% in hampers; and 6% in bales. (In calculating the surtax relating to the conventional treatment, the basis will be the conventional duty applicable to the portion of the article involving its classification.)		
318	Wares of india rubber combined with very fine materials.	240.00	....
	Children's toys and games of soft india rubber, combined with very fine materials	240.00	200.00
	Tare—20% in cases and casks; 13% in hampers; and 6% in bales.		
319	Wares of india rubber with mounting of precious metals: (a) Of gold	850.00	....
	(b) Of silver	600.00	....
	Tare—20% in cases and casks; 13% in hampers; and 6% in bales.		
320	Articles for technical purposes: (a) Fabrics for cards for carding factories, by permission and under control .	7.00	....
	(b) Tubing of or combined with india rubber, with or without layers of fabrics or inlaid wire. (Note: Tubing made of patent sheets is to pay duty under No. 309 (conventionalized).	70.00	65.00
	Tare—13% in cases and casks; 9% in hampers; and 2% in bales and sacks.		
	(c) Packing (engine packing) .	100.00	80.00
	(d) Transmission belts	100.00	80.00
	(e) Pneumatic tires (inner or outer tubes)	150.00	....
	(f) Insulating material of patent sheets, vulcanized or not ..	130.00	100.00
	(g) Fittings for technical and electro-technical purposes, for instruments, etc., of hardened india rabber, except such as are included under No. 314 (a) ..... (Note: For telephone and microphone construction, by permission and under control.)	135.00	115.00
		100.00	90.00
	(h) India rubber press cloths and other technical articles not specially mentioned	120.00	....
	Tare—13% in cases and casks; 9% in hampers; 2% in bales and sacks..		

St. Pierre and Miquelon

French goods are admitted free of duty into St. Pierre and Miquelon. Imports from all other countries are subject to equal rates.

The French franc is in use and is equal to $0.193 at par. Duties are paid in paper francs. Kilo = 2.2046 pounds avoirdupois.

Item No.	Articles.	Rate of Duty, Francs per 100 net kilos.
245	India rubber, gutta-percha and asbestos manufacturers, of any style, including clothing made up or not	70.00
246	Boots and shoes of rubber and rubbered fabrics	40.00

Bristol Plant Shutsdown

It is reported that the National India Rubber Co., Bristol, R. I., has suspended operations in its wire division for a two-week period, commencing Aug. 31. The shoe division closed down for four days, commencing at the same time. A slowing up in the selling season is cited as the reason for the temporary shutdown.

MARKETS

Cottons and Fabrics

NEW YORK, SEPT. 3, 1923

The cotton market and the cotton trade refused to get panicky over the unfavorable developments in the last two weeks of August. Values prevented strong resistance to news which ordinarily would have brought about a decided reaction. Early in the period there was the report of the Bureau of the Census that showed a slump of 80,591 bales in the domestic consumption of cotton for July. This falling off in July also forecasts another decrease in August as a result of further curtailment of production by the cotton mills. Then, more disquieting was the flock of rumors and reports on the damage to the crop in Texas where continued drought had changed a crop which at one time had the brilliant prospect of a possible 5,000,000 bales into a near calamity as estimated at 4,000,000 or maybe, as the report circulated, 3,500,000 bales. And in spite of all this and still more unfavorable news on the foreign political outlook the market refused to get unduly excited.

Despite the decline of 80,591 bales in July, compared with June, cotton consumption was ahead of the corresponding month in 1922 when 458,002 bales were consumed, — compared with 461,575 bales this year. The slowing down of the mills was also indicated by the number of active spindles, the report indicating 34,237,887 for July, compared with 34,843,421 for June this year, and 32,051,820 in July last year.

Cotton stocks on July 31 were reported to be 2,087,919 bales, compared with 2,831,553 bales in 1922, 6,534,360 bales in 1921 and 3,563,162 bales in 1920. Stock on hand in public storage and at compresses was 938,689 bales, compared with 1,232,888 on June 30 this year which shows a decrease of 678,634 bales in the amount of cotton on hand and is still less than the holdings in previous years. In consuming establishments there were 1,089,230 bales on July 31. The bales above mentioned included the following: Consumed in 1923, 6,277 Sea Island, 65,126 American Egyptian, 261,326 Egyptian and 80,862 other foreign; in consuming establishments on July 31, 1923, 2,947 Sea Island, 10,524 American-Egyptian, 86,508 Egyptian and 25,992 other foreign; held in public storage and at compresses, 4,070 Sea Island, 18,697 American - Egyptian, 51,446 Egyptian and 19,744 other foreign.

Imports during July totaled 6,356 bales, compared with 13,367 in June, and 8,587 in July, 1922. Exports during July totaled 171,469 bales, the smallest since August 1921, compared with 214,851 bales in June this year and 373,242 bales in July of 1922.

Shipments to Germany were larger this year than in June or July of 1922. The July total was 82,218 bales, against 49,777 bales in June, and 64,587 in July, 1922.

During the year there were imported 329,335 bales of Egyptian, 21,185 Peruvian, 50,240 Chinese, 45,679 Mexican and 22,163 British Indian.

COTTON REPORT A BIG SURPRISE

The report of the Department of Agriculture issued on August 31 showing a condition of 54.1 per cent of a normal crop when private estimates had indicated a condition around 56 per cent was a surprise to the cotton trade. A yield of only 10,788,000 bales was forecasted. Prices of cotton were advanced over $5.00 a bale during the day on which the report was issued.

EXTRA STAPLE COTTON

The demand for the extra staple lengths was not very pronounced though there was some interest in inch and three sixteenths. The general asking price for inch and three sixteenths, strict middling, was around 31 cents. There was little inch and a quarter available and inch and five-sixteenths held at 35 cents upward. The following are quotations on extra staple cotton, strict middling in grade and color, f.o.b. New Bedford:

1 1/8 inch, 28½ to 29½ cents
1 3/16 inch, 30 to 31½ cents
1 1/4 inch, 32 to 33½ cents
1 5/16 inch, 35 cents upward

There was a revival of interest in Egyptian, and medium grade uppers sold from 29 to 31 cents. Medium grade Saks ranged from 34 to 36 cents. Mitafifi, high grade was quoted at 30 cents and medium grade at 29½ cents. Tangris, strict middling, brought 30 cents. Pima cotton was quiet, brokers asking 34 cents for No. twos and 32 cents for No. threes.

A dispatch from London states that a syndicate composed of the largest growers of Egyptian cotton has induced the Egyptian government to intervene in the cotton market in the hope of forcing up prices. The syndicate contends that this year's crop will be 30 per cent smaller than last year and that the American crop will be seriously curtailed.

Cotton prices as of Aug. 30 on the New York Cotton Exchange were as follows:

	Open.	High.	Low.	Close.	Previous Day.
Oct.	24.60	24.60	24.26	24.35@24.38	24.39
Dec.	24.45	24.47	24.18	24.26@24.27	24.30
Jan.	24.11	24.12	23.91	23.92	24.01
March	24.14	24.15	23.97	23.97@24.03	24.04
May	24.10	24.13	23.90	23.93@23.95	24.03

TIRE FABRICS

The tire fabric market has passed through the dullest period of the year and the next two weeks should find tire manufacturers and producers of fabric pointing in a more definite direction. The irregularities of the situation will be somewhat cleared up by the government's cotton report, a more definite idea of tire stocks in manufacturers and dealers hands and more accurate estimates of automobile production. Quotations during the past two weeks showed little change but all through the summer there has been a considerable spread between the actual trading price and the quoted price. Corded peeler cords are now quoted at 51 cents and square woven fabric as low as 48 cents.

CORD FABRICS

Combed Sakellarides		.68	@	.70
Combed Peeler	lb.	.56	@	.61
Carded Peeler	lb.	.51	@	.55
Combed Egyptian uppers	lb.	.60	@	.64
Carded Egyptian uppers	lb.	.55	@	.60

SQUARE WOVEN

17¼-ounce Egyptian uppers, combed	lb.	.57	@	.61
17¼-ounce Egyptian uppers, carded	lb.	.52	@	.58
17¼-ounce Sakellarides, combed	lb.	.65	@	.67
17¼-ounce Peeler, combed	lb.	.54	@	.58
17¼-ounce Peeler, carded	lb.	.48	@	.53

SHEETINGS— The action of mills in curtailing production has tended to stiffen the prices of all cotton fabrics. Early in the month interest in sheetings had lagged somewhat but towards the end of the period there was more activity and prices held firm with advances noted. There were sales of 40 inch, 3.75 yard, at 10¾ cents and for 40 inch, 3.60 yard, 11¾ cents was quoted.

DUCKS— Normal buying has not come into the duck market but mills now report more activity. Orders for both single and double filling were more frequent and good commitments have been made in enameling at 46 to 52 cents a pound depending on width and make. The range on single filling was from 20½ to 22 cents, card basis, according to the grade and double filling brought 22 to 23 cents.

BURLAPS— Most burlaps are attractively low and it would seem that the bottom of the decline had been reached. Increased interest is being shown in the market and during the last week there was good inquiry in both spot and afloat material.

(Fabric Price Quotations will be found on page 441)

Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, Aug. 30, 1923—On the whole the demand for industrial chemicals was on a broader scale with better inquiry on contracts covering next season's requirements and with more spot and prompt business being done. Most items were firm in the confidence that buyers would soon come into the market to provide for their future needs. The first place of interest continues to be occupied by the alkalies which were firm with contract withdrawals heavy. Increased production in carbon black has brought about a better situation in this market and trading in the zinc oxides was very satisfactory. There was no pronounced weakness in any quarter of the market and business is expected to improve materially in September.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .90 @	.95
Aniline oil, drums	lb.	.16½ @	.17
Diphenylguanidine	lb.	1.20 @	—
Excellerex,	lb.	.45 @	.50
Formaldehyde-Aniline	lb.	.52½ @	—
Hexamethylene-tetramine	lb.	.95 @	1.00
Paraphenylenediamine	lb.	1.55 @	1.60
Super-Sulphur No. 1	lb.	.50 @	.60
Super-Sulphur No. 2	lb.	.25 @	.35
Tetramethyl—Thiuramdisulphide	lb.	6.00 @	—
Thiocarbanilide, kegs	lb.	.35 @	.40
Vulcocene	lb.	.35 @	—

Inorganic

Lead, sublimed blue	lb.	.09¼ @	—
Lead, white	lb.	.09¼ @	—
Litharge, domestic	lb.	10.40 @	14.00
Lime, Superfine	lb.	.02 @	.02½
Magnesia, calcined, light,	lb.	.23 @	.24
extra light	lb.	.45 @	—
heavy	lb.	.05 @	.06
Orange Mineral	lb.	.14 @	.15

COLORS

Blacks

Carbon Black	lb.	.15 @	.20
Micronex		.16 @	.18
Lamp Black	lb.	.12 @	.40
Bone "	lb.	.05½ @	.07½
Drop "	lb.	.07½ @	.10
Ivory "	lb.	.15 @	.45

Blues

Prussian	lb.	.50 @	.55
Ultramarine	lb.	.08 @	.35
Cobalt	lb.	.21 @	.26

Browns

Iron oxide	lb.	.04 @	.05½
Sienna, Italian,	lb.	.05½ @	.14
Umber, Turkey,	lb.	.04 @	—
Vandyke, domestic	lb.	.03½ @	.04

Greens

Chrome, light	lb.	30 @	.32
medium	lb.	.32 @	.34
dark	lb.	.34 @	.42
commercial	lb.	.12 @	—

Reds

Antimony crimson, 15/17% F.S.	lb.	.36 @	.45
sulphur free	lb.	.39 @	.50
golden, 15/17% F.S.	lb.	.20 @	—
calcium and sulphur free	lb.	.40 @	—
red sulphuret 15/17% F.S.	lb.	.19½ @	—
Indian, English	lb.	.08 @	.12
Commercial		.08 @	.12
Para toner	cwt.	1.00 @	1.10
Red Oxide, reduced	lb.	.08 @	.12
pure	lb.	.12 @	.17
Toluidine toner	lb.	2.10 @	2.25
Venetian red	lb.	.03½ @	.06
Vermillion, quicksilver, English	lb.	1.20 @	—
domestic	lb.	.25 @	.30

Whites

Albalith	lb.	.07 @	.07½
Aluminum bronze	lb.	.55 @	.60
Azolith	lb.	.07 @	.07½
Lithopone, domestic (factory)	lb.	.07 @	.07½
Zinc Oxide—American Process			
American Horse Head special	lb.	.08½ @	.09
XX red	lb.	.08 @	.08½
American Azo: ZZZ (lead free)	lb.	.08 @	.08½
ZZ (under 5 per cent leaded)	lb.	.07¼ @	.07¾
Z (8-10 per cent leaded)	lb.	.07¼ @	.07¾
Zinc Oxide—French Process			
White seal	lb.	.12 @	.12¼
Green seal	lb.	.10¾ @	.11¼
Red seal	lb.	.09¾ @	.10¼

Yellows

Chrome, light		.18 @	.18½
dark and medium	lb.	.18 @	.18½
Cadmium Sulphide	lb.	1.50 @	1.75
Other, French	lb.	.02 @	.03
domestic	lb.	.01½ @	.03

COMPOUNDING INGREDIENTS

Aluminum flake	ton	29.00 @	—
hydrate light	lb.	.18 @	.20
Ammonia carbonate,	lb.	.09 @	.10½
Barium carbonate,	ton	66.00 @	73.00
Barium Dust	lb.	.05 @	.06
Barytes southern off-color, ton		15.00 @	20.00
Western, prime white	ton	28.00 @	—
Basofor	lb.	.04¾ @	—
Blanc fixe, dry f.o.b. works	lb.	.04 @	.04¼
Carrara filler	lb.	.01½ @	.02
Chalk, precipitated, extra light	lb.	.04¼ @	.05
heavy	lb.	.03¼ @	.04
Clay, China, domestic,	ton	15.00 @	16.50
Dixie	ton	22.00 @	32.00
Blue Ridge	ton	20.00 @	30.00
Fossil flour	ton	60.00 @	—
Glues, extra white	lb.	.30 @	.40
medium white	lb.	.20 @	.26
cabinet	lb.	.18 @	.30
cabinet low grade	lb.	.16 @	.19
common bone	lb.	.08½ @	.14
Graphite flake, bbls.	lb.	.06½ @	.12
amorphous	lb.	.05 @	—
Infusorial earth, powdered ton		60.00 @	—
bolted	ton	65.00 @	—
Liquid latex	gal.	1.30 @	—
Mica, powdered	lb.	.15 @	—
Rotten Stone (powdered)	lb.	.02½ @	.04½
Soapstone, powdered	ton	12.00 @	15.00
Starch, powdered	cwt.	3.20 @	3.22
Talc, domestic	ton	15.00 @	18.00
French	ton	20.00 @	—
French, high grade	ton	40.00 @	—
Italian	ton	47.00 @	58.00
Terra Alba	cwt.	1.85 @	2.00
Tripoli, white	lb.	.02 @	.02½
Whiting, commercial	cwt.	1.00 @	1.25
English cliffstone	cwt.	1.50 @	2.50
gilder's bolted	cwt.	1.10 @	1.25
Paris white American	cwt.	1.25 @	1.50
Quaker	ton	13.00 @	15.00
Wood pulp XXX	ton	35.00 @	—
" " X	ton	25.00 @	—
Zinc Oxide—lead free	lb.	.08 @	—
5 per cent leaded		.07¼ @	.07¾
10 per cent lead sulphate	lb.	.07¼ @	.07¾
20 per cent lead sulphate	lb.	.07¼ @	.07¾
35 per cent lead sulphate	lb.	.07¼ @	.07¾

(Also see whites)

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M.R.	ton	36.00 @	47.00
Hard hydrocarbon	ton	31.00 @	42.00
Soft hydrocarbon	ton	30.00 @	40.00
Pioneer M.R.	ton	42.00 @	44.00
320/340 M. P. hydrocarbon (c. l. factory)	ton	45.00 @	50.00
300/310 M. P. hydrocarbon (c.l. factory)	ton	40.00 @	45.00
Synpro, granulated, M. R. (factory)	ton	55.00 @	70.00

SOFTENERS

Acids

Acetic, 28 per cent	cwt.	3.38 @	3.63
Cresylic, 97 p.c.	gal.	1.00 @	1.15
95 p.c.	gal.	.95 @	1.10
Muriatic, 20 degrees	cwt.	1.00 @	1.10
Nitric, 36 degrees	cwt.	4.50 @	5.00
Sulphuric, 60 degrees	ton	11.00 @	12.00
66 degrees	ton	15.00 @	16.00
Tartaric, crystals	lb.	.36 @	—

Alkalies

Caustic soda, 76%	cwt.	3.15 @	3.16½
Soda ash, 58%	cwt.	1.38 @	1.69

Oils

Castor, No. 3, bbls.	lb.	.13 @	—
Corn, crude, bbls.	lb.	.09¾ @	.10
refined	lb.	.13 @	—
Chinawood, bbls	lb.	.22 @	.22½
Cottonseed,		.11 @	11.50
Glycerine,	lb.	.17 @	.17½
Linseed, domestic	gal.	.91 @	.93
Palm Niger	lb.	.06⅝ @	.06⅞
Lagos	lb.	.07 @	.07¼
Peanut, domestic, crude	lb.	.15 @	—
Pine, steam distilled	gal.	.72 @	.75
Rapeseed, refined	gal.	.76 @	.78
blown	gal.	1.00 @	1.05
Rosin, first rectified	gal.	.45 @	—
second rectified	gal.	.47 @	—
Tar, commercial	gal.	.31½ @	—
Soya Bean		.11½ @	.11¾
Petroleum, amber	lb.	.04½ @	—
dark amber	lb.	.03¼ @	—

Resins and Pitches

Cumar resin, hard	lb.	.09 @	.10
soft	lb.	.09 @	.10
Parra M.R.	lb.	.06 @	.07
Tar Retort	bbl.	11.00 @	—
kiln burned	bbl.	11.00 @	—
Pitch, Burgundy	lb.	.05 @	.06
coal tar	lb.	.01½ @	.02
pine tar	lb.	.03 @	—
Rosin, grade K	bbl.	5.90 @	—
Shellac, fine orange	lb.	.90 @	—

Solvents

Acetone, drums	lb.	.25 @	—
Alcohol, denatured, No. 1 bbls.	gal.	.45 @	.47
Benzol, tanks	gal.	.27 @	.32
Benzol, 90 per cent	gal.	.25 @	.30
pure	gal.	.30 @	.35
Carbon bisulphide,	lb.	.06½ @	.07
Tetrachloride	lb.	.09 @	.10½
Dimethylaniline	lb.	.41 @	.43
Motor gasoline, steel bbls.	gal.	.19½ @	—
Naptha, V. M. & P.	gal.	.18½ @	—
Toluene		.30 @	.38
Turpentine, spirits	gal.	.95 @	—
wood	gal.	.85 @	—

Waxes

Beeswax	lb.	.40 @	.42
Carnauba, No. 1	lb.	.42 @	.43
Ceresin, white	lb.	.10 @	.11
Bayberry	lb.	.28 @	.33
Phenol	lb.	.28 @	.30
Montan, crude	lb.	.05 @	.05½
Ozokerite, black	lb.	.23 @	.24
green	lb.	.27 @	.28
Paraffine	lb.	.02¾ @	.03
Sweet wax	lb.	.10 @	.12

SUBSTITUTES

Black	lb.	.09½ @	.14
White	lb.	.10 @	.16
Brown	lb.	.10 @	.15
Brown factice	lb.	.09 @	.15
White factice	lb.	.09½ @	.16

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.38 @	—
Sulphur chloride (jugs)	lb.	.05 @	.06
" " (drums)	lb.	.05 @	.06
Sulphur flour (bbls.)	cwt.	2.75 @	3.30
(bags)	cwt.	2.50 @	2.75
Commercial		1.35 @	1.70
Superfine		2.00 @	2.40
Sulphur, 100 per cent pure,		— @	—
Bergenp't brand (bags)	cwt.	2.50 @	2.80
(bbls.)	cwt.	2.75 @	3.05

Chemicals

Carbon Black—Increased production has relieved the scarcity in the spot market and goods are being moved to consumers without delay. There were 8,000,000 pounds more carbon black produced in this country last year than in the previous year and the demand was so great that some 14,000,000 to 15,000,000 pounds of reserve stock was drawn into the market. The expansion in production makes it possible to take care of the equally large demand this year and will be ample to take care of the increase in demand for some time to come.
Prices were a little easier with 15 cents quoted at New York.

Zinc Oxide—The demand from tire manufacturers fell off considerably during August but makers look for a renewal of business from this quarter in the early fall. French process, red seal, in bags, is quoted at 9¾ cents a pound; barrels carlots, 10 cents; less than carlots, 10¼ cents; green seal, bags, 10¾ cents; barrels, carlots 11 cents; less than carlots, 11¼ cents; white seal, barrels, carlots, 12 cents, less than carlots, 12½ cents. American process, commercially lead free, bags, 8 cents; barrels carlots, 8½ cents; less than carlots, 9 cents.

Litharge—The market was inactive and under the influence of seasonal dullness throughout the period. Prices remained unchanged with casks quoted at 10.40 cents a pound; 100 to 500 pound kegs, 14 cents a pound; 500 to 2,000 pounds, 12.60 cents; 2,000 to 10,000 pounds, 12.09 cents.

Lithopone—There was a good tone to this market and producers look for a heavy demand throughout the remainder of the year. It has been a wonderful year and rubber makers have been heavy purchasers. Prices are unchanged at 7 cents a pound for bags; 7 to 7¼ cents, carlots; less than carlots, 7¼ to 7½ cents.

Barytes—The demand for barytes is well up to the season and there is an active call for the material. Prime western holds firm at $28.00 a ton, f.o.b. point of production and southern off color is $15.00 to $20.00 a ton.

Caustic Soda—The alkalies have been immune to the summer dullness and the market for caustic soda continues very firm and active. Producers quoted for 76 per cent on contract at works, $3.15 to $3.16½ per hundred pounds, carlots.

Soda Ash—Like caustic soda this market continued active all summer along broad lines and was unaffected by the summer depression. Prices are firm and some producers are disinclined to accept business very far ahead on account of the rising cost of production. Light ash, 58 per cent basis, is quoted at $1.38 per hundred pounds, carlots, at works and $1.69 in barrels.

Aniline—There are no surplus stocks in the market and with the improvement in demand the market has taken on a steadier tone. Tanks at work are quoted at 16 cents and for spot goods in drums 16½ to 17 cents prevailed.

Talc—The demand for both domestic and imported talc continues to increase and the tone of the market is good. Domestic brings $15.00 to $18.00 per ton, f.o.b. works; French $20.00, high grade French, $40.00; Italian, $47.00.

Scrap Rubber

NEW YORK, AUGUST 31, 1923

Prices in the scrap rubber market were decidedly stronger during the past fortnight. Mixed auto swing upward from $4 to $6 a ton, quoted $16 @ $18 a ton, while bicycle tires likewise jumped $7 a ton.

The recent advance in prices of crude rubber is said to have caused the prices of scrap to mount, and now dealers assert that there is a moderate volume of buying on the part of manufacturers. At the same time dealers assert that scrap prices are low at their present levels.

Boots and shoes advanced ⅜ of a cent, inner tubes No. 1 being quoted at .04¾ @ .05. Dealers assert that there was a fair demand for both shoes and tubes during the past two weeks, while there was also some purchases of rubber hose, the demand for the latter article being dormant for the past three months. Further advances in prices are anticipated. Prices quoted at this date are:

Auto tire peelings		.01¼ @	.01½
Standard White auto	ton	20.00 @	25.00
Mixed auto	ton	16.00 @	18.00
Bicycle tires	ton	14.00 @	16.00
Clean solid truck tires		.01¼ @	.01½
Boots and shoes		.03⅛ @	.03⅜
Arctics, trimmed		.02 @	.02¼
Arctics, untrimmed		.01⅛ @	.01⅝
Inner tubes, No. 1		.04¾ @	.05
Inner tubes, compounded		.03½ @	.03¾
Inner tubes, red		.03¾ @	.04
Battery jars, clean hard rubber		.02 @	.02½
Rubber Hose		.00⅞ @	.01
Red packing		.01 @	.01¼
White druggist sundries		.04 @	—

Reclaimed Rubber

NEW YORK, AUGUST 31, 1923

There was a decidedly stronger undertone to the reclaimed rubber market during the past two weeks. Boots and shoes (unwashed) advanced one cent, quoted .12 @ .12½. Dealers state that manufacturers have been doing some buying, but that the volume of all business has not been as large as has been expected. It is said that should there be a continued upswing in the prices of crude rubber that reclaimed prices will advance proportionally.

Floating tube was quoted at .15½ @ .15¾ cents, an advance of one-half point, while tires (auto black) moved upward one point, quoted .10 @ 10¼. Dealers state that they believe that manufacturers stocks are somewhat lower than at our last report. Prices quoted at this date are:

Floating Tube	.15½ @	.15¾
Friction	.21½ @	.22¼
Boots and Shoes (unwashed)	.12 @	.12½
Boots and Shoes (washed)	.12½ @	.13¼
Mechanical	.10 @	.11
Hose	.10 @	.11
Tires, truck	.08½ @	.09
Tires, auto, black	.10 @	.10¼
Black (washed)	.11 @	.11½
White	.13 @	.13½
Grey	.11 @	.11½

Crude Rubber

NEW YORK, AUGUST 31, 1923

Crude rubber prices have oscillated upward during the past two weeks. The cause for this upswing is said to be caused by the falling off of arrivals in London and the falling off of quarterly business in the United States. Dealers here are predicting that imports by American Manufacturers during the remainder of the year will be 40 per cent off, compared with the first six months. Arrivals of crude rubber totaled about 18,000 tons for the month of August, compared with 34,000 and 36,000 tons during the earlier months of the year.

Most dealers are asserting that buyers are awaiting a reaction in market prices, and for that reason manufacturers have not been buying. Dealers assert that it would be better for the industry if manufacturers would make commitments ranging from 60 to 80 days. Very few orders have been received for delivery in December, January or February. Business with the larger manufacturers have fallen off from 40 to 60 per cent.

Considerable attention has been given the possibility of the World's consumption reaching the 460,000 ton mark. It is stated by authorities that the United States will probably import about 147,000 tons of rubber during the last six months of the year, against 193,000 for the first six months. It is also said that the world's surplus stocks by the end of 1923 will total about 100,000 tons, against a surplus of 124,000 tons for 1922. Collectively dealers feel as though the Restriction Act is working out favorably to all parties concerned.

There was a modern amount of activity in the lower grades of plantations at irregular prices, which, however, averaged better than during the past two weeks. Paras were neglected.

Quotations at this date are as follows:

Plantations			
Ribbed Smoked Sheets	.30 @	.30¼
First Latex, spot	.30 @	.30¼
Sept.-Oct.	.30 @	.30¼
Oct.-Dec.	.30¼ @	.30½
Jan.-March	.31 @	.32
Jan.-June	.31½ @	.32
Amber Crepe No. 1, spot	.29¼ @	.29½
Amber Crepe No. 2, spot	.29 @	.29¼
Amber Crepe No. 3, spot	.28½ @	.28¾
Light Clean Thin Brown Crepe	.29 @	.29¼
Commercially Clean Thin Brown Crepe	.28½ @	.28¾
Specky Brown Crepe	.28¼ @	.28½
Roll Brown Crepe, spot	.27¾ @	.28
Paras			
Madeira Fine	.28½ @	.28¾
Acre Fine	.28 @	.28¼
Up-river Fine	.28 @	.28¼
Up-river Medium	.26½ @	.26¾
Up-river Caucho Ball (shipment)	.24½ @	.24¾
Up-river Coarse	.24 @	.24¼
Islands Fine	.24½ @	.24¾
Islands Medium	.24½ @	.24¾
Islands Coarse	.14 @	.14½
Cameta	.14 @	.14⅛
Xingu Ball	.23½ @	.23¾
Tapajos Fine	.26½ @	.26¾
Tapajos Medium	.23 @	.23¼
Pontianac			
Prime Pressed	.13 @	.14
Plantation	.07½ @	—
Bangermassin	.08 @	—
Siak Gutta Percha	.20¾ @	—
Prime Macassar	3.00 @	—
Balata			
Surinam Sheets	.80 @	.85
Columbia Block	.60 @	.65
Venezuela Block	.70 @	.75

Trade Marks

AUG. 21, 1923

RUBBER-WELD—No. 174,215. Rubber-Weld Sales Co., Boston, Mass. For: Rubber repair outfits—namely, rubber-surface buffers, rubber sheeting, and rubber cement.

Trade mark shows figure of a lion with words "Blue" above and Trade Mark below figure—No. 175,924. William Isaac Ewing, Atlanta, Ga. For inner-tube patches, inner tubes, tire shoes and automobile tires.

KAWECO—No. 178,339. Weber & Co., A. G.; Heidelberg, Germany. For fountain pens.

KO-MIO—No. 178,340. Weber & Co., A. G.; Heidelberg, Germany. For fountain pens.

A five pointed star with word MacLean's printed across—No. 178,755. MacLean Drug Co., Chicago, Ill. For floatation devices, tennis balls, toy vehicles, golf balls, toy balloons, etc.

GUL-FLYT—No. 178,916. Gimbel Brothers, N. Y. City. For golf balls.

MAXIM—No. 179,278. Harry C. Lee & Co., N. Y. City. For golf balls.

TOWN AND COUNTRY—No. 179,551. Puffer-Hubbard Manufacturing Co., Minneapolis, Minn. For child's wagon tire.

JACK—No. 179,601. Jack Tire and Rubber Co., Spokane, Wash. For pneumatic automobile tires and inner tubes.

COAST CORD RANGER—No. 179,656. Coast Tire and Rubber Co., Oakland, Calif. For rubber tires.

SCOUT FORTY-NINE—No. 179,657. Coast Tire and Rubber Co., Oakland, Calif. For rubber tires.

SKWEZME—No. 179,709. William Caldwell, N. Y. City. For dolls, rubber dolls, balloons when used as toys and squawkers.

UNCLE WIGGILY—No. 180,640. Fred A. Wish, Inc., N. Y. City. For rubber balloons and inflated balls, toy and doll furniture.

AUG. 28, 1923

LOXIT—No. 167,658. Herbert H. Roosa, Rochester, N. Y. For boots and shoes, shoe heels, shoe shanks, and parts of boots and shoes, made wholly or in part of leather, canvas, rubber, fabric, metallic or textile material, or combinations thereof.

BABY KINS—No. 171,434. Robert M. Raphael, New York City. For shoes of leather, rubber, fabric and combinations thereof, garters, etc.

Oblong drawing containing words "All Wool" and "United Tailors Association" — No. 175,831. The Style-Center Tailoring Co., Cincinnati, Ohio. For overcoats, raincoats, boots and shoes made of rubber, fabric or combinations of these.

A rectangular drawing with oval in center containing a woman's shoe with a fancy design upon a dark background—No. 178,327. Cammeyer, New York City. For shoes of leather, rubber, fabric, or combinations of these materials.

A square with picture of woman's shoe encircled by a fancy design upon a dark background—No. 178,328. For shoes of leather, rubber, fabric or combinations of these materials.

JAX—No. 178,844. Holtite Manufacturing Co., Baltimore, Md. For rubber heels for shoes.

New Incorporations

CONNECTICUT

Swinehart Rubber Company of Connecticut, Inc., to deal in tires and accessories. Authorized capital $50,000; paid in $3,000. Principal office, Hartford, Conn. Incorporators: George B. Kinsler, Andrew P. Gunn and Francis A. Stockwell—all of Hartford, Conn.

MARYLAND

Wyatt Rubber & Chemical Co., to deal in rubber and chemicals. Capital, 500 shares, common stock, no par and 500 shares of preferred stock, $100 par. Principal office, Baltimore, Maryland. Incorporators: J. L. Warner, C. E. Wyatt and C. M. Wyatt—Baltimore, Maryland.

Tiger Tire & Rubber Corp. 1,000,000. Principal office, Baltimore, Maryland.

NEW JERSEY

The Fisk Flap Tube Rubber Co. $500,000. Principal office, Camden, New Jersey. D. Parker Gravalt, president; E. Kelsey Moore, Collingswood, N. J., secretary.

NEW YORK

Bowler Tire Co., to deal in tires. $5,000. Principal office, Amsterdam, New York. Incorporators: A. M. Bowler, W. D. Bowler and M. Vankeuren. Attorney, C. E. Hardies, Amsterdam.

Malone Rubber Company, Inc., to deal in rubber products. $100,000. Principal office, Malone, New York. Representative, J. L. Kelly, Malone, New York.

Genesee Rubber Corporation, to deal in tires etc. 250 shares, preferred stock, par $100; 750 shares common stock, no par. Principal office, Syracuse, New York. Directors: Benjamin E. Shove, Arthur Lundberg and Howard W. Clasen—all of Syracuse.

George M. Hamilton Corporation, to manufacture rubber and textile goods. $150,000. Incorporators: E. C. Kerr, P. W. Quinn and G. M. Hamilton of 4 Sheridan Square, New York City.

DELAWARE

Andrews Armor Tire Co., to manufacture tires. $100,000. Representative, Franklin L. Mettler.

Argo Asbestos and Rubber Co. $25,000. Incorporators: L. A. Vezie, J. E. Alick. Agent, Capital Trust Co. of Deleware.

Capital Increased

Leather and Rubber Specialties Co., of Birmingham, Alabama from $2,000 to $50,000.

Posner-Ormond Tire Co., of Birmingham, Alabama from $2,000 to $5,000.

Cotton Fabric Prices

(Continued from Page 438)

SHEETINGS					
40-inch	2.50-yard	yd.	.16	@	—
40-inch	2.85-yard	yd.	.13¾	@	—
40-inch	3.15-yard	yd.	.14¼	@	.14½
40-inch	3.60-yard	yd.	.11¾	@	—
40-inch	3.75-yard	yd.	.10½	@	.10¾
40-inch	4.25-yard	yd.	.10	@	—
DUCKS					
Belting		lb.	.40	@	.42
Hose		lb.	.40	@	.42
Enameling		lb.	.46	@	.52
Shoe Ducks		lb.	.45	@	.48
Single filling		lb.	.20½	@	.22
Double filling		lb.	.22	@	.23
BURLAPS (Carload Lots)					
7½-ounce	40-inch		6.15	@	—
8 -ounce	40-inch		6.25	@	—
10 -ounce	40-inch		7.00	@	—
10½-ounce	40-inch		7.05	@	—
DRILLS					
37-inch	3.25-yard	yd.	.12½	@	—
37-inch	2.75-yard	yd.	.14	@	—
37-inch	3.00-yard	yd.	.13¼	@	—
37-inch	3.50-yard	yd.	.11½	@	—
37-inch	3.95-yard	yd.	.10¾	@	—
OSNABURGS					
30-inch	7-ounce		.15½	@	.16
40-inch	7-ounce		.16	@	.16¼

Workings of Stevenson Plan

The *Wall Street Journal* in commenting upon the workings of the Stevenson Restriction Act has this to say regarding normal world stocks. "While the danger of a physical rubber shortage appears remote, a stock around 200,000 tons at the end of the year would be normal. As the principal consuming market for rubber is 12,000 miles from the source of production, trade authorities believe that normal world stocks should represent, on the basis of current consumption, the equivalent of 90 days' supply in the United States, six weeks' afloat and six weeks in London. The total represents a six months' supply. With world consumption in 1923 at the rate of 35,000 tons monthly, six months' supply would be 200,000 tons."

Goodrich Lay-Off Announced

Fully 500 workmen in the B. F. Goodrich's factory at Akron, are said to have been laid off recently, although H. K. Raymond, vice-president in charge of production, said that "the company had planned to release a few men and that the plan would be completed so that only 180 men would be off the pay roll." At the same time Mr. Raymond said that he expected this to be the last general lay-off. The Goodrich Company, according to Mr. Raymond, had no plans with regard to changing their present policy.

Rubber Patents

GRANTED AUG. 21, 1923

1,465,313 Tire Cover. Carl E. G. Palmen, Los Angeles, Calif.

1,465,354 Demountable Rim. Robert J. Donogh, New York, N. Y.

1,465,364 Vulcanizing Tool. Edward L. Petit, Moline, Ill.

1,465,376 Resilient-Tire Rim. James F. Stranahan, Pittsburgh, Calif., assignor of one-half to John F. Mora, Pittsburgh, Calif.

1,465,504 Rubber Footwear. William B. Wiegand, Montreal, Quebec, Canada.

1,465,609 Conveyor for Vulcanizing Presses. Colin Macbeth and Harry Willshaw, Limited, Westminster, London, England.

1,465,646 Contour Caliper. Hector V. Lough, Hartford, Conn., assignor to The Hartford Rubber Works Company, a Corporation of Connecticut.

1,465,648 Quick Acting and Attachable Valve. George McNeill, Detroit, Mich., assignor to Morgan & Wright, a Corporation of Michigan.

1,465,697 Stone Guard for Dual Pneumatic Tires. Sheldon P. Thacher, Freehold, N. J., assignor to Morgan & Wright, a Corporation of Michigan.

1,465,718 Demountable Wheel Rim. Karl I. Nutter, Martinsville, Ind.

1,465,725 Self-Registering Pressure Gage. Junius A. Bowden, Los Angeles, Calif., assignor to A. Schrader's Son, Inc., New York, N. Y., a Corporation of New York.

1,465,726 Self-Registering Pressure Gage. Junius A. Bowden, Los Angeles, Calif., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y., a Corporation of New York.

1,465,769 Collapsible Tire Building and Finishing Core. Joseph R. Quin, Cudahy, Wis.

1,465,775 Mold for Rubber Heels. William Bernstein, Jamaica Plain, Mass., assignor to Panther Rubber Manufacturing Company, Stoughton, Mass., a Corporation of Massachusetts.

1,465,837 Flat-Tire Alarm. Michael J. Barry, Newark, N. J.

1,465,867 Inner Tube. Jefferson Riley, West Durham, N. C.

1,465,889 Divided Casing with Detachable Tread. Robert Wright, Cleveland, Ohio.

1,465,898 Nonpneumatic Tire. Carl Adolf Fisk, New York, N. Y.

GRANTED AUG. 28, 1923

1,465,966 Slitting Means. James A. Cameron and Gustaf Birger Birch, Brooklyn, N. Y. assignors to Cameron Machine Company, Brooklyn, N. Y., a Corporation of New York.

1,465,967 Slitting and Rewinding Machine. James A. Cameron and Gustaf Birger Birch, Brooklyn, N. Y., assignors to Cameron Machine Company, Brooklyn, N. Y., a Corporation of New York.

1,466,009 TireTubing Machine. Harry Absolam Weidaw, Akron, Ohio.

1,466,028 Machine for Boring Tires and the Like. John Miley, Reddish near Stockport, England, assignor to Craven Brother (Manchester) Limited, Reddish, England.

1,466,086 Method of Making Piston-Rod Packing. George Christenson, North Plainfield, N. J., assignor to Johns-Manville Incorporated, a Corporation of New York.

1,466,087 Composite Piston-Packing Ring and Method of Making Same. George Christenson, North Plainfield, N. J., assignor to Johns-Manville Incorporated, a Corporation of New York.

1,466,133 Resilient Tire. Carl G. Lundstrom, Boone, Iowa.

1,466,205 Elastic Rim. Leo Carlberger, Modling, Austria.

1,466,210 Rubber-Tired Wheel. Howard J. Ferris, Harvard, Ill., assignor to Hunt, Helm, Ferris & Company, Harvard, Ill., a Corporation of Illinois.

1,466,318 Means for Curing Tires. Harry F. Waters, Denver, Colo., assignor to Karl C. Schuyler, trustee, Denver, Colo.

1,466,366 Expansible Core. Paul R. Erich Lehmann, Dayton, Ohio.

1,466,407 Detachable Rubber Heel. William A. Maloney, Newton, Mass.

1,466,443 Apparatus for Supplying a Drying Medium. Charles E. Bradley, Montclair, N. J., and Joseph G. Coffin, Hempstead, N. Y., assignor to General Rubber Company, a Corporation of New Jersey.

1,466,498 Tire. Henry C. Fitch, Demos, Ohio.

1,466,522 Resilient Tire. Pierino Di Cesare, New York, N. Y., assignor to The Cesar Resilient Tire Corporation, New York, N. Y.

1,466,535 Manufacture of Triaryl Guanidines. Lucas P. Kyrides, Buffalo, N. Y., assignor to National Aniline & Chemical Company, Inc., New York.

1,466,609 Rubber Ball. Joseph W. Weaver, Lebanon, Pa.

THE RUBBER AGE BUYERS GUIDE

ACCELERATORS
Dovan Chemical Corp., New York.
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
National Aniline & Chemical Co., Inc., New York.
Roessler & Hasslacher Chemical Co., New York.
Rubber Service Laboratories Co., The, Akron, O.
Vanderbilt, R. T. Co., Inc., New York.
Wishnick-Tumpeer Chemical Co., Chicago.

ACCUMULATORS
Adamson Machine Co., Akron, O.
Akron Rubber Mold & Machine Co., Akron, O.
Allen Machine Co., Erie, Pa.
Birmingham Iron Foundry, Derby, Conn.
Wellman - Seaver - Morgan Co., Cleveland, Ohio.

ACIDS
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
National Aniline & Chemical Co., Inc., New York.
Wishnick-Tumpeer Chemical Co., Chicago.

ACID TANKS
Birmingham Iron Foundry, Derby, Conn.
Devine, J. P., Co., Buffalo, N. Y.
Farrel Foundry & Machine Co., Ansonia, Conn.

AIR & STEAM METAL BAGS
Allsteel Ridewell Tire & Rubber Co., Dayton, Ohio.

AIR BRAKE HOSE
United States Rubber Co., New York.

AIR GOODS
Davol Rubber Co., Providence, R. I.
Hodgman Rubber Co., Tuckahoe, N. Y.
United States Rubber Co., New York.

AIR MATTRESSES
Davol Rubber Co., Providence, R. I.
Hodgman Rubber Co., Tuckahoe, N. Y.
United States Rubber Co., New York.

AIRPLANE AND BALLOON CLOTHS
Hodgman Rubber Co., Tuckahoe, N. Y.
United States Rubber Co., New York.

ALBA WHITING
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
Industrial Chemical Co., New York.
Wishnick-Tumpeer Chemical Co., Chicago.

ALCOHOL
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
Tyler Patterson Co., Clev'd., O.
Wishnick-Tumpeer Chemical Co., Chicago.

ALUMINUM FILLER
Wishnick-Tumpeer Chemical Co., Chicago

ALUMINUM FLAKE
Aluminum Flake Co., Akron, Ohio.
Butcher, L. H., Co., New York.
Fulper, Edward B., Trenton, N. J.
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
Rubber Service Laboratories Co., The, Akron, O.

AMMONIA AQUA
Laidlow, Kelly & Co., New York.
Tyler Patterson Co., Clev'd., O.
Wishnick-Tumpeer Chemical Co., Chicago.

ANGLE THERMOMETERS
Taylor Instrument Companies, Rochester, N. Y.

ANILINE OIL
Butcher, L. H., Co., New York.
Fulper, Edward B., Trenton, N. J.
Klipstein, A., & Co., New York.
National Aniline & Chemical Co., Inc., New York.
Tyler Patterson Co., Clev'd., O.
Wishnick-Tumpeer Chemical Co., Chicago.

ANILINE OIL PLANTS
Devine, J. P., Co., Buffalo, N. Y.

ANOLIDE
National Aniline & Chemical Co., Inc., New York.

ANTIMONY, SULPHURETS
Butcher, L. H., Co., New York.
Fulper, Edward B., Trenton, N. J.
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
States Metals Co., Inc., New York.
Rare Metal Products Co., Belleville, N. J.
Richo Manufacturing Co., Utica, N. Y.
Tyler Patterson Co., Clev'd, O.
Typke & King, Mitcham, England.
Wishnick-Tumpeer Chemical Co., Chicago.

APRONS—RUBBER
Hodgman Rubber Co., N. Y. City.
I. B. Kleinert Rubber Co., N. Y. City.
Miller Rubber Co., Akron, Ohio.

ARTIFICIAL RUBBER
Carter Bell Mfg. Co., New York.
Stamford Rubber Supply Co., Stamford, Conn.

ASBESTINE
Butcher, L. H., Co., New York.
Fulper, Edward B., Trenton, N. J.
Harshaw, Fuller & Goodwin Co., The, Cleveland, O.
Tyler Patterson Co., Clev'd, O.
Wishnick-Tumpeer Chemical Co., Chicago.

ATOMIZERS
The Rubber Products Co., Barberton, Ohio.

AUTOCLAVES
Devine, J. P., Co., Buffalo, N. Y.

AUTOMOBILE COATS
Hodgman Rubber Co., Tuckahoe, N. Y.
United States Rubber Co., New York.

AUTO TOP FABRICS
Hodgman Rubber Co., Tuckahoe, N. Y.
Taylor, Armitage & Eagles, Inc., New York.

CABARRUS COTTON MILLS

M. L. CANNON
PRESIDENT & TREASURER

KANNAPOLIS, N. C.

Superior Quality Tire Fabrics

EGYPTIAN-PEELER
KARDED & COMBED
CORD & SQUARE WOVEN

CANNON MILLS, Inc.
Selling Agents

NEW YORK
55 Worth St.

CHICAGO
327 S. La Salle St.

A. W. REID
Representative